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NUMBER 4.

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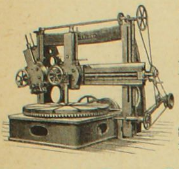

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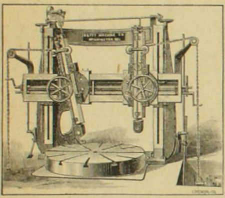

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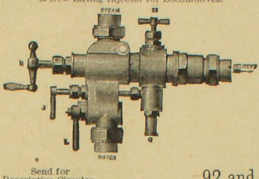

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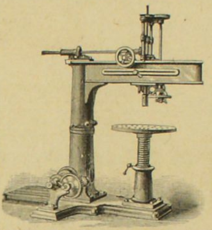

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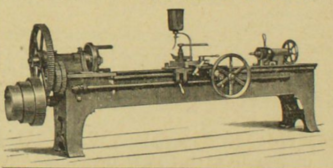

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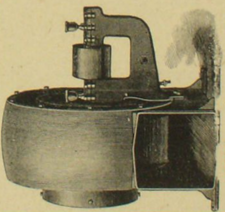

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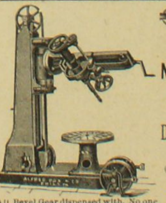

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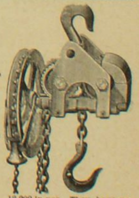

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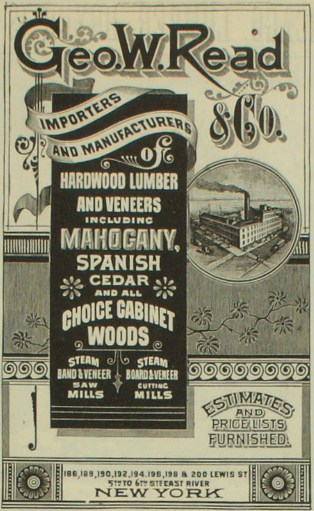

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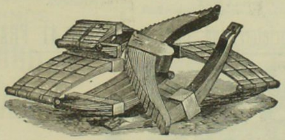

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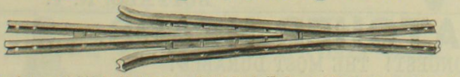

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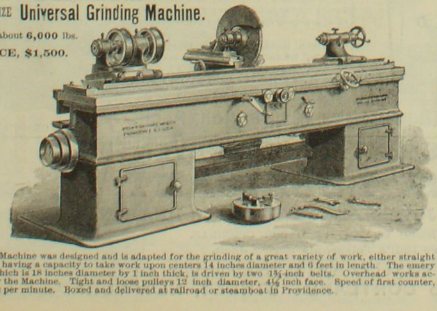

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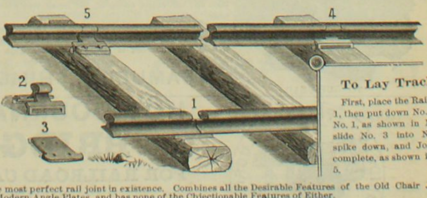

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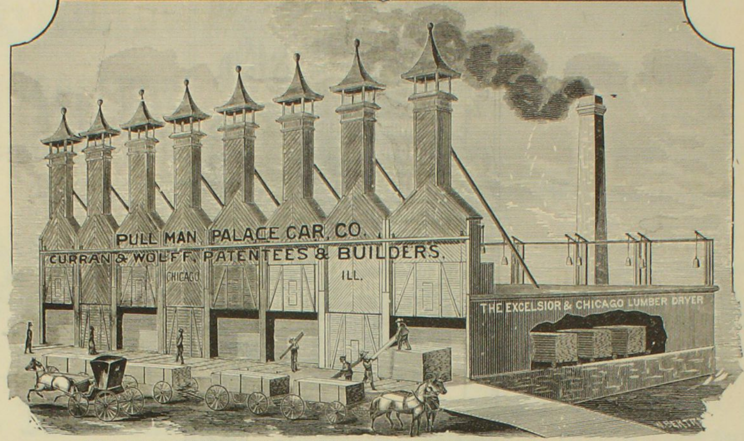
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" " Oct. 11th, 1884, 39 " "	353,552
" " Oct. 18th, 1884, 45 " "	426,302
116	1,060,215

Average for each kiln per day for 3 weeks, allowing 5½ days to the week, 9,139 91-116 feet.

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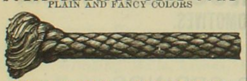

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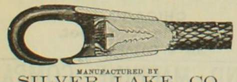

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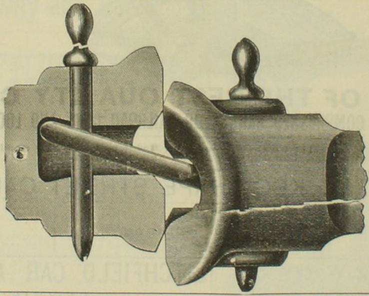

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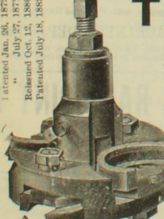
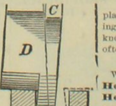


TONGUE HEAD.

The Bits are arranged in upper and lower series, and secured to a Head having seats alternately inclined for the purpose of giving the side clearance to their cutting points. This explains why these Bits hold their shape and turn out standard work until used up; the entire circle of Bit being tool cutting edge.

This diagram represents a Bit (*D*) in the position it occupies when making a cut: the Bit (*C*) which follows to complete the work is given in outline. This explains the division of cut and the free and easy working of the Tool. They finish hard cross-grained and knotty lumber neatly, showing clean-cut edges and often *save their cost in one day's run.*



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" July 27, 1875.
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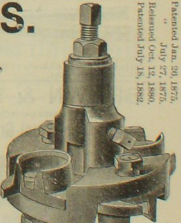

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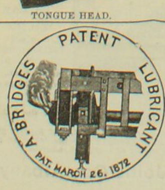

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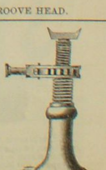

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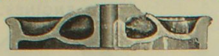

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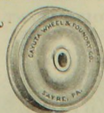
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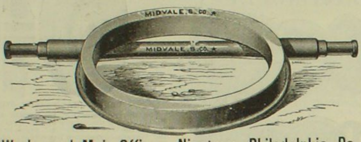
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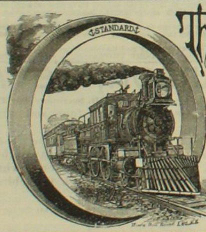

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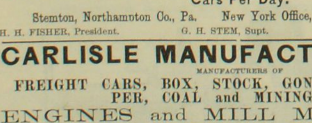

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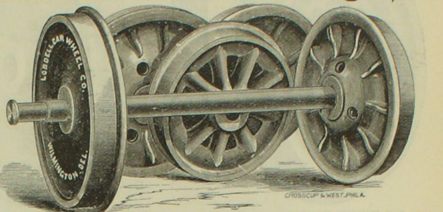
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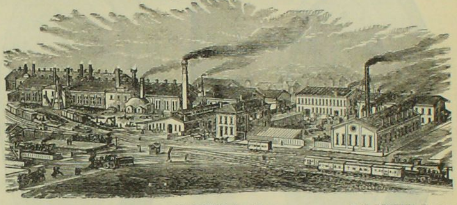

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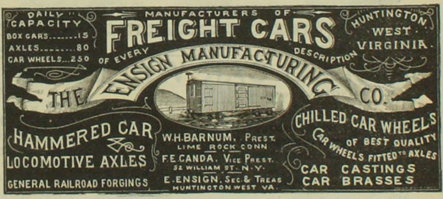

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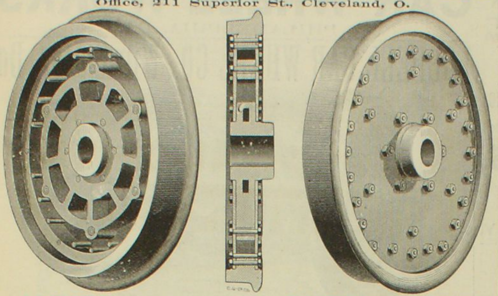

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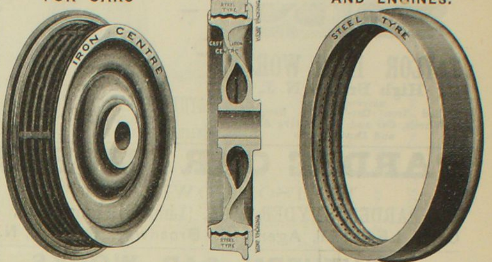

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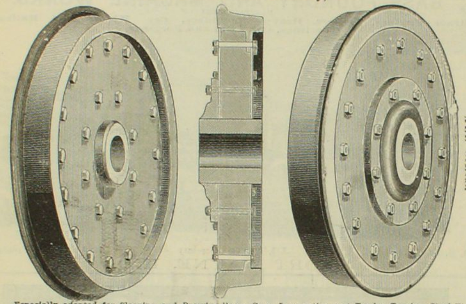

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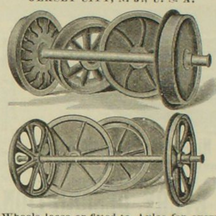

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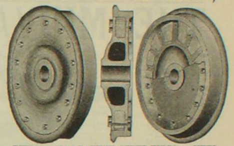

THE THOMAS PATENT STEEL-TIRED WHEEL.

The above engraving represents a new Steel-Tired Car Wheel having practically an indestructible non-metallic bearing for the tire, of sufficient depth to intercept and destroy the vibrations common to ordinary chilled iron car wheels, and steel-tired wheels in which the tire rests directly upon a metallic centre, thus producing a noiseless wheel and one securing increased life for the tire and axle.

This is accomplished by casting a centre having a series of pockets or recesses on its circumference, **opening outward,** formed by the back plate of the casting extending to the top of the pocket, and the front plate to about half the height of the pocket, and separated from each other by radial metal walls. Into these pockets are forced from the periphery of the casting wedge shape blocks of wood, so treated that there is no possibility of shrinkage or deterioration. The wooden blocks before insertion are of such size that the pressure necessary to seat them secures their retention in the pockets when the pressure is removed, and when turned off to receive the tire they extend slightly beyond the radial walls, the tire thus bearing only on wood. To secure the tire to the centre, bolts pass through the internal flange and the radial walls, and, having a bearing in metal their entire length, hold more firmly than when allowed to pass in part through the cushioning material.

Attention is called to the wheel as one of few parts, to the facility with which it may be refitted with new tire, and that the life of the wooden bearing is measured by the number of times the casting will admit of refitting to axle.

The wheel is manufactured by The Jersey City Wheel Foundry and Machine Works.

For further information address THEODORE THOMAS, P. O. Box 129, Jersey City, N. J.

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The great hardness of the chilled tread has hitherto rendered the operation of turning them impracticable, owing to the great expense, which made it cheaper to frequently replace the worn wheels with new ones. To obviate these objections and reduce the cost of this process, we furnish a machine capable of making a perfect wheel at small expense.

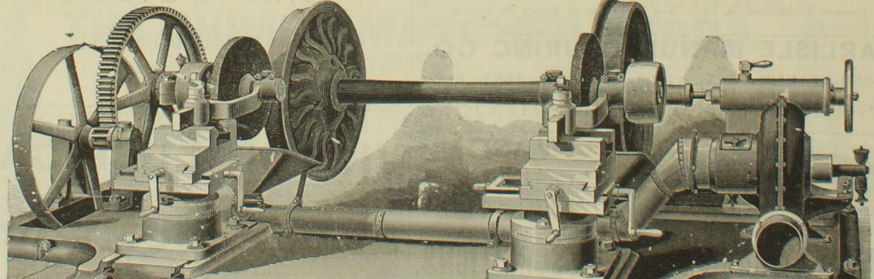
Wheels with flat places, and otherwise badly worn, that are ordinarily condemned and used for scrap iron, can be ground and fitted so as to double their original mileage. This alone makes our machine the greatest money saver ever introduced to railroads.

A sound Chilled Car Wheel trued by our method cannot be excelled by a paper or any other description of Car Wheel with steel tire.

Any person having a slight acquaintance with tools may, after five hours' instruction, become thoroughly competent to operate our machine.

Allowing all new wheels to be 3-32 inch oval, if properly fitted to axles, our machine *will* true up one pair an hour.

We manufacture expressly for use with our machine, Abrading Wheels, which, as the result of a series of experiments and long experience, we guarantee to be the best grinding wheels made. No odor, no glaze, and we defy competition.



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We are prepared to sell machines outright, or to furnish them on royalty for each pair of wheels trued.

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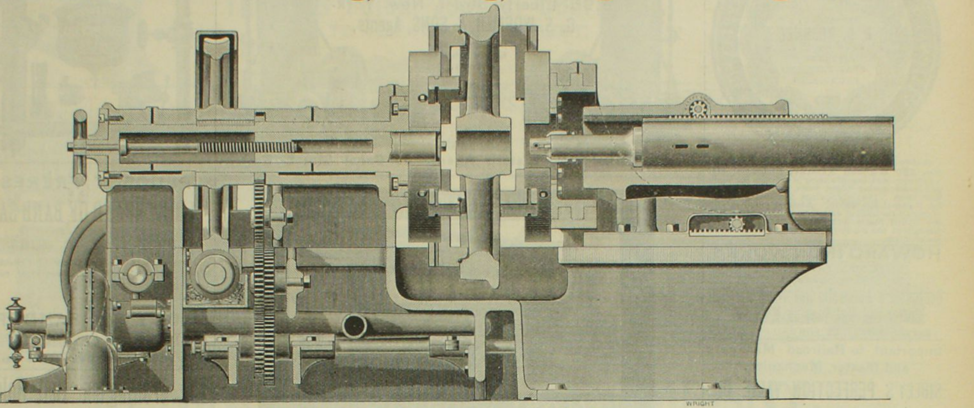

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The long-felt want of a machine having greater capacity and accuracy for operating upon every construction, "including new and worn wheels withdrawn from service," is herewith represented, and will be placed for parties ordering the same upon a guarantee in writing. After a test, should it fail to have greater capacity and accuracy than *any* other tool, we agree to *remove it free of charge.*

It will bore the axle seat, turn the tread and flange of any steel or steel-tired wheel simultaneously.

It will centre any steel or steel-tired wheel by its already bored axle seat, turn the tread and flange in less time than any tool in existence.

It will *bore* and *true* a chilled iron wheel in less time, removing less chill therefrom, than any tool or system of tools for such purpose.

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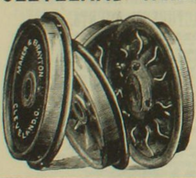

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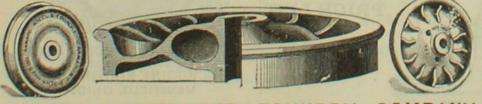

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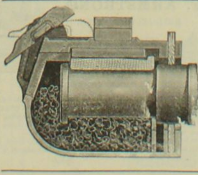

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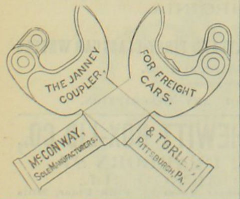
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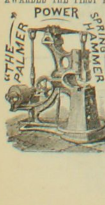

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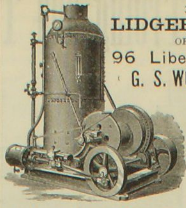

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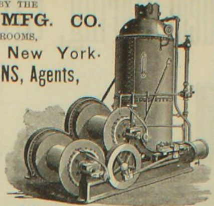

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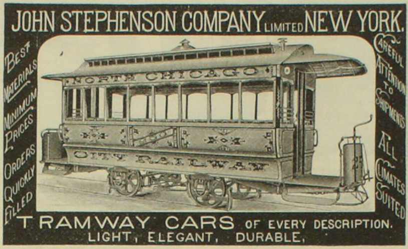

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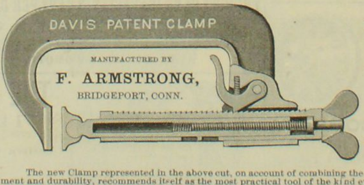

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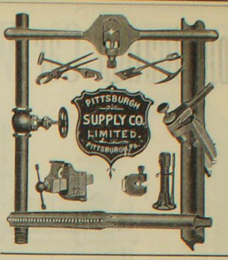
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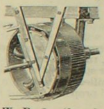

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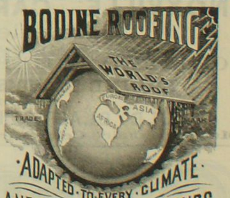

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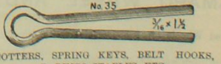

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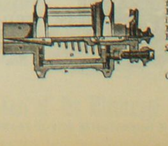

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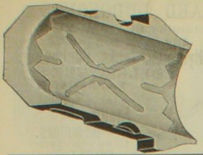

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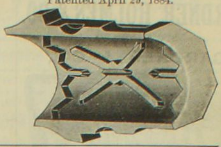

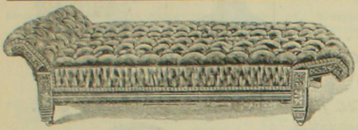

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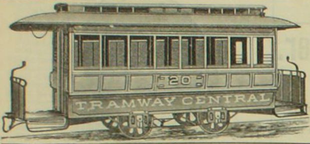

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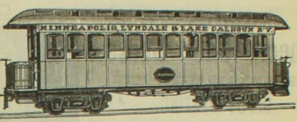

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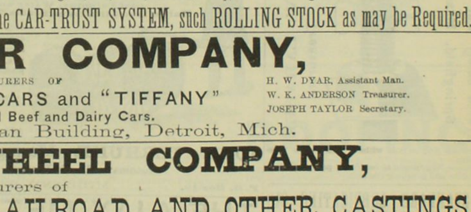

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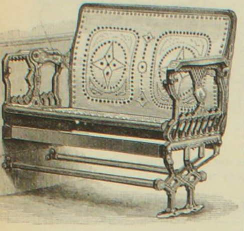

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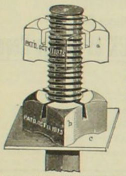

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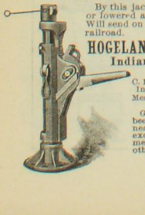

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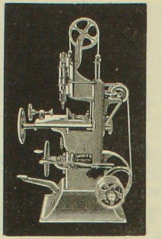

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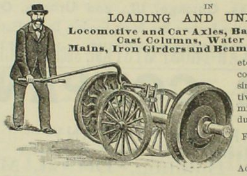

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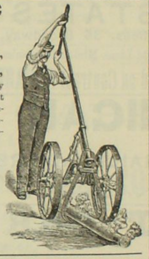

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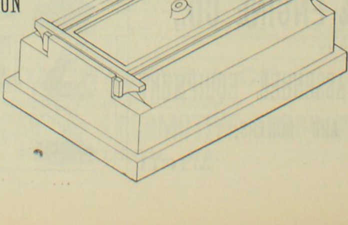

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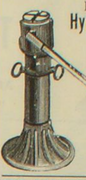

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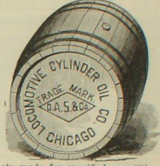

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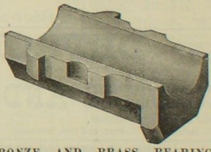

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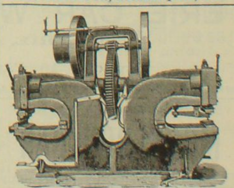

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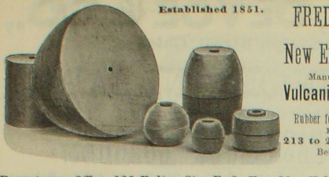

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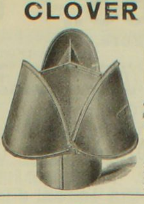

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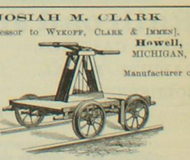

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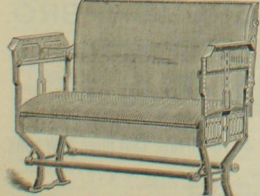

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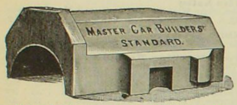
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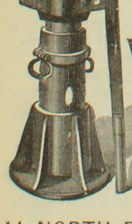

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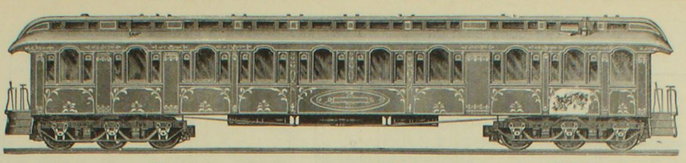


DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XVI. NUMBER 4.

APRIL, 1885.

SINGLE NUMBERS, TEN CENTS. $1.00 PER ANNUM.

Miscellaneous Items.

THE Lafayette (Ind.) Car Works are building 400 box cars for the Louisville, New Albany & Chicago road ; also 25 refrigerator cars.

THE Illinois Central has given orders for the building of 500 box cars ; 200 are to be built at their own shops and 300 by the Pullman Company.

THE January statement of the Baltimore & Ohio Employés' Relief Association shows that benefits were paid to 934 members during the month.

THE Baltimore & Ohio Railroad Co. has let a contract to the Pullman Company for the construction of six B. & O. buffet sleepers and six regular sleeping coaches.

THE Suakim-Berber Railway, in Egypt, will be 4-8½ gauge, and its probable length 270 miles. The carriages, it is said, will be loopholed for offensive and defensive purposes.

THE Union Pacific Railway has placed an order with the Westinghouse Air-Brake Co. for the equipment of 900 freight cars with its brake by the time summer transportation begins.

THE Cincinnati Railway Club has elected the following officers : Col. Orland Smith, President ; Louis O'Shaughnessy, Vice-President ; J. W. McGill, Treasurer ; and A. H. Caffee, Secretary.

MR. SAMUEL C. FORSAITH died in Philadelphia, March 23, while on his way home from a trip to the South. He was for many years a prominent business man of Manchester, N. H., and head of the S. C. Forsaith Machine Co. of that city.

THE Michigan Car Co. are building 300 coal cars for the Wheeling & Lake Erie road, 150 refrigerator cars for Armour & Co., of Chicago, and 50 for the Chicago, Milwaukee & St. Paul; also 100 stock and 50 coal cars for the Atchison, Topeka & Santa Fé.

THE Central Pacific Railroad Company are making arrangements to burn petroleum to make steam for the shops at Sacramento, Cal., instead of wood and coal. Ten large iron tanks have been placed on a huge framework of wood to get the necessary fall, so as to have the oil feed the fire by gravitation.

THE Pittsburgh, Ft. Wayne & Chicago road now runs double-headers on its freight trains, handling on some divisions 60 cars per train. Such trains are manned by one conductor and three brakesmen. This arrangement saves one conductor and one brakesman, who would be necessary if this load were run as two trains.

THE Birmingham, England, railway station covers 54,000 square feet, or between eleven and twelve acres. It has cost about $5,000,000, and is the largest railway station in the world. If this structure was located on this side of the Atlantic it would be called the grand union, central or some other kind of depot, instead of plainly "station."

THE cold weather has developed serious defects in the design of the road-bed of the Philadelphia Traction Co.'s cable road. The freezing of the ground causes a very heavy pressure to be brought to bear upon the sides of the wrought-iron conduits, followed by jamming of the grip. Very extensive and costly changes will be necessary and have now begun.

AT the New Haven shops of the New York, New Haven & Hartford road, four new baggage cars have just been completed. An old postal car has also been rebuilt and divided into three compartments with an outside door to each. The central compartment is to be used for postal work, and the other two for express freight and baggage respectively. The shops are busy painting and rebuilding old cars, which come in as fast as they can be spared. On one day last month the paint shop had 28 cars in it.

AN exchange proposes that street railways that charge five-cent fares should sell twelve tickets for fifty cents, or 25 for a dollar, assuming that people would ride oftener and take shorter rides by reason of the reduction. This is undoubtedly true. A person will ride three times at five-cent fares, when he would only ride twice at six cents, the result being a gain of three cents to the road. There is also another gain in the length of the ride, the two six-cent rides probably covering a longer distance than the three five-cent rides. In such case the road is a double gainer.

IT is stated in a paper read before the last Car Painters' Convention, by Mr. R. McKeon, that in the Southern States the life of a dark color on cars is less than half that of a buff or straw color, and that dark cars have to be repainted after twelve months' service, while the light-colored cars will run from a year and a half to two years without repainting. In regard to this matter it may be said that some of the painters who favor dark colors take extra pains to do good work, even more than is usually considered necessary with other colors. In this way they are able to make a very good showing with a bad color.

IT is calculated that a locomotive boiler will last until the engine has traveled over 350,000 miles. On some lines, however, the boiler, under favorable circumstances, particularly when pure water is used, may travel 400,000 or 500,000 miles before becoming unserviceable. Assuming that the life of an engine is determined by the endurance of the boiler, and that if, under favorable circumstances, it will last the 500,000 miles, then during that time it is estimated that the fire box will probably require to be renewed at least three times, the wheels five or six times; the crank axles three or four times, and the tubes from seven to ten times.

A DISPATCH says that a trial trip of the finest locomotive ever turned out of the New York Central shops at West Albany was successfully made to Schenectady March 25. The engine was built for service on the Chicago limited express, and with the special view of economy and speed. Her cylinders are 17 × 24 and her fire-box constructed with steam jets which destroy the smoke. Her machinery is of superior quality, and many improvements are incorporated. It is estimated she will draw the express at the average rate of a mile a minute and will save one ton of coal in every run of 150 miles. She is numbered 520 and will go into immediate service.

THE Boston & Albany Railroad Co. has just completed at its Allston shops two new drawing-room cars, which it will in a few days place on one of the fast New York express trains. They are built in the same substantial and elegant manner as those now in service, with some slight improvements in several particulars. It is now the intention of the company to commence within a short time the construction of two more drawing-room cars, to be designed on the Mann plan, with the Mann oval-shaped roof, ventilating arrangement and light weight, and other features. The work will be pushed during the summer, and the cars will, it is expected, be ready for service early in the fall.—*Railroad Gazette.*

THE *Wood Worker* mentions a new process of toughening timber, by which whitewood can be made so tough as to require a cold chisel to split it. This result is reached by steaming the timber and submitting it to end pressure, technically "upsetting" it, thus compressing the cells and fibres into one compact mass. It is the opinion of those who have experimented with the process, that wood can be compressed 75 per cent., and that some timber which is now considered unfit for use in such work as carriage building, could be made valuable by this means; and more especially since the rapid consumption of our best ash and hickory will sooner or later render some substitute necessary.

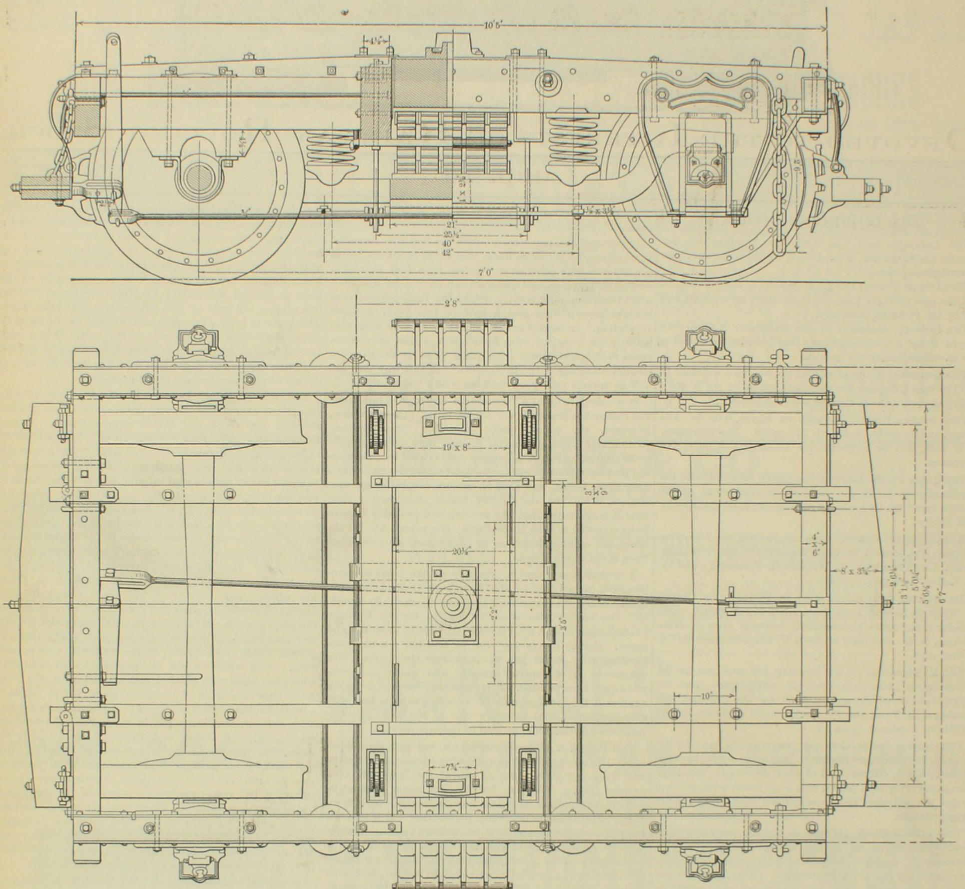
THE London & Northwestern Railway Company, apparently have a strong prejudice against cars with trucks. To obtain the advantages of a long body, they have introduced a system by which two cars are connected with each other by passages or gangways at the ends, covered by canvas and leather hoods. These are telescopic, so that they slide in and out in buffing, and form flexible but closed connections. In this way short body carriages are converted into sleeping coaches without inconvenience. The idea is a good one, and its adoption in this country would be a decided improvement in the service of some of our through trains. In rainy or inclement weather the passage to and from the dining car would be much easier, and in all cases there would be less danger in going from one car to another.

JUDGE CHURCHILL, of Boston, in his decision in the inquest concerning the death of William M. Lord, a brakeman on the Eastern Rail " who was knocked from the top of a car on March 13 by coming in contact with a bridge near Revere, after reviewing the circumstances, says: "His death adds another to the list of deaths caused by leaving a narrow space of only a few feet between the top of freight cars on railroads and bridges constructed overhead, obliging railroad employés to be constantly on the alert to protect themselves by lying flat or crouching down upon the roof of cars where their duty calls them. This is likely to be a frequent source of the loss of valuable life in the future, as it has been in the past. Death may be said to have resulted in this case from a faulty system of bridge construction, coupled with the lack of such a degree of vigilance as men seldom possess."

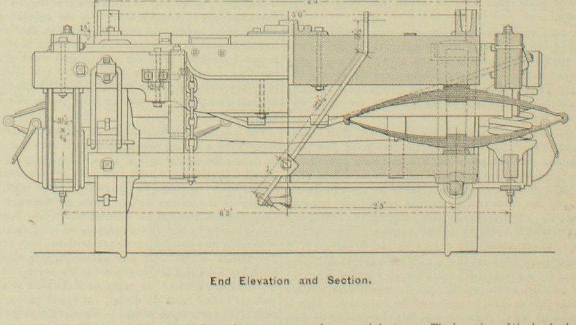
THE New York, New Haven & Hartford Co. has recently completed at its New Haven shops several new cars for the fast New York and Boston express trains. Among them are two buffet cars, the interior of which is finished in mahogany, and varnished. The head-lining is quarter-sawed oak and is very handsome. In the saloon are 21 Wheeler chairs upholstered in gold plush. The carpet is peacock blue, with old gold lines in the border. There are no sofas in the ends. The buffet has a plate-glass front reaching to the floor, and protected by three silver-plated bars. Two raw silk curtains drape the glass and are held in place by a pair of curtain-knobs which contain enamel medallions. The glass and silver table of the buffet is set off by a panel behind it filled with crimson plush, and making a fine background for the display of the silver, glass and porcelain. At one side of the plate glass in the buffet, a panel affords room for several very beautiful pieces of stained glass containing cut jewels, which gives the end of the car a very rich appearance. The windows are all provided with transoms, which are filled with painted and stained glass, the work being done on a kind of "crackle" glass, which produces a very brilliant effect. All the windows have folding brass screens, which are put in place when the windows are raised, and which to a great extent exclude the dust. The smoking room is upholstered in leather and has seats for six persons. The glass panels in this room are obscured, but have a delicate, transparent ivy-leaf pattern. The transparent glass panels in the doors have a similar etched pattern. There are saloons at both ends of the car. The slabs in the toilet room are Tennessee marble. Though not expensively fitted up, these rooms are very rich and elegant. These cars are painted a dark olive on the outside, and have 42-inch paper wheels.

IT is often a matter of pride with car-builders to have a new car go out on the road and not make its appearance in the shops for eighteen months or two years. We question whether this is good policy. Would it not be much better to have the car come in after six months' service, to have the rods and bolts tightened, cracks in joints stopped, and other precautions taken of a similar kind? When cars are built of timber which has not had a long and thorough seasoning, an overhauling is necessary after a few months on the road. When seasoning-cracks in paint and varnish are closed, the truck taken down, and all looseness due to shrinkage taken out, the car is better fitted to run two years or more without coming into the shop than it was to run a year when first completed. If the history of some of the oldest cars in service could be traced, it would be found that they had been well cared for at first. The life of a car is almost unlimited if the joints can be made weather-tight, the frame kept dry and the slack of rods, braces and trusses taken up as often as shrinkage makes it necessary. Cars frequently become rotten at the window sills and in the posts from weather cracks. These cracks make their appearance in many cars before the varnish needs renewal. Such cracks could be economically stopped without the necessity for revarnishing. Sometimes the work can be done so quickly that the car will only be detained a few days in the shop. It is very important to have all the iron work of the truck perfectly tight. This prevents the joints from grinding and wearing. While these things are generally understood, they are too frequently neglected, and the result is a great loss to the roads. Cars, which should be sound and strong in their frames for twenty years, get out of shape in half that time. The only cause for this is neglect to keep the frame dry and the nuts and trusses tight.

PARLOR CAR CONSTRUCTION—OLD COLONY AND BOSTON & LOWELL RAILROADS.



Plan, Longitudinal Section and Side Elevation of Truck.



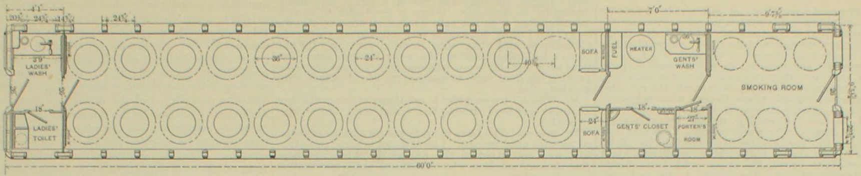
End Elevation and Section.

THE engravings represent the floor plan, inside finish and trucks of several parlor cars built by the Wason Manufacturing Co., for the Old Colony and Boston & Lowell roads.

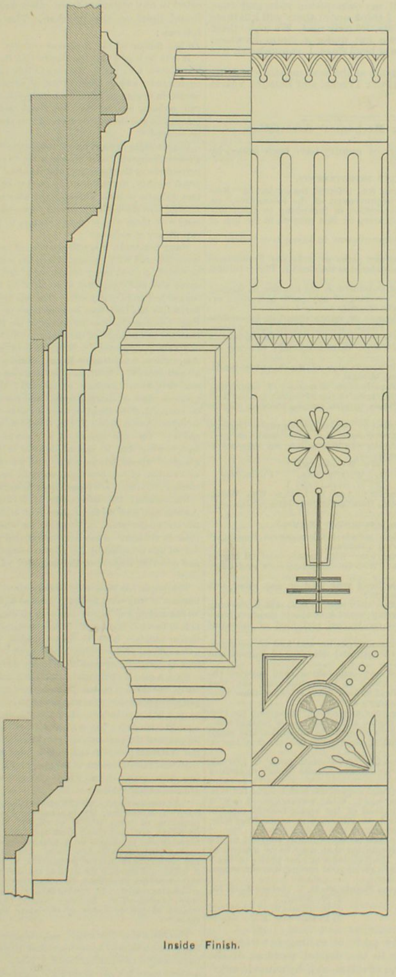
The interior arrangement, as will be seen in the plan, is somewhat different from that of other cars of this class. The main saloon has twenty-two, and the smoking room six chairs, and between these compartments are the heater, porter's room and gentlemen's lavatory and closet. At the opposite end is the ladies' toilet. By this construction the smoking room is very completely isolated from the main saloon; and to aid in this, the intermediate partitions are carried up into the raised roof, leaving no communication from one side to the other except through the doors. The heater is not inclosed, which leaves more room around it and the basin. This arrangement has proved very satisfactory, and is thought to be better than the usual way of dividing up the space.

The general style of the inside finish is in low relief; the ornaments are incised, and when rosettes are introduced they are sunk below the surface. This flat ornamentation is very effective and beautiful, and should receive the attention of builders who are inclined to favor heavy mouldings and projections.

The truck shown in the cuts represents those in use under one of the Old Colony cars. It is fitted with long elliptics and long-link swing-motion. The links are mortised into the transoms and wheel-pieces, which are faced on both sides with iron. The truss-rods, of which there are only two, are outside of the transoms, but have bearings in stirrups which come up against the bottom of the transoms, and in this way give an equal strain upon the two without a tendency to cant them over. The swing-beam is of unusual size, being 19 inches wide by 8 inches thick. It rests on ten 5-leaved elliptics, which are 36 inches between centers. This truck, we believe, is a special design by the Wason Co. for these cars, and it has proved very satisfactory. The hanging of the brake-beams, position and arrangement of the brake-levers with their bent ends, the guides for the levers, and other details have been very carefully worked out. Check-chains are used upon one end only. These are well secured and have a good bearing on the metal sides of the wheel-pieces.



Floor Plan of Parlor Car.



Inside Finish.

THE Grand Trunk car shops at Point St. Charles, Montreal, are building several immigrant sleeping cars. The interior woodwork is ash, nicely finished and decorated, and the arrangements for water, light and heat are excellent. The seats are so contrived that they may be turned into sleeping berths at night, while overhead the arrangements are after the fashion of the Pullman cars, but bare, the immigrants being expected to provide bedding.

THE *American Machinist* says that the Pennsylvania Railroad Co. are experimenting with lighting their cars by means of electricity carried in storage batteries. They use the lights on a train running between Altoona and Pittsburgh, and the arrangement has worked satisfactorily. The storage batteries are charged in the company's shops by connection with a dynamo-electric machine. It takes about nine hours running to charge the batteries with sufficient electricity for the round trip. The intention is, should the plan be found advisable for general use on the through trains, to establish electric plant at different stations for charging the batteries. The batteries are quite easily handled, and can be changed without any trouble.

Western Railway Club.

LOCOMOTIVE PISTON RODS, ROCKER ARMS, CROSS-HEADS, ETC.

The Club held its regular monthly meeting March 18. The following members were present:

B. K. Verbryck, Chicago, Rock Island & Pacific, President; Allen S. Cooke, Chicago & Atlantic; W. S. Calhoun, Congdon Brake Shoe Co.; Charles F. Pierce, Tiffeny Refrigerator Car Co.; George W. Stevens, Lake Shore & Michigan Southern; Wm. Forsyth, Chicago, Burlington & Quincy; B. McDevitt, Western Division City Railway, Chicago; Jas. McCarthy, Chicago Car Roofing Co.; W. M. Wilson, Otis Iron & Steel Co.; Chas. D. Ettinger, Murphy & Co., Chicago; Jos. M. Rogan, A. French Spring Co.; F. W. Redpath, Chicago, and S. H. Edgerly, Michigan Central R. R.

The following new members were admitted: Charles Pullman (Hicks & Smith, Chicago); Chas. P. Choate (Detroit Steel & Spring Works).

The President announced the subjects for discussion to be the best material for piston-rods and rocker-arms of locomotives, cross-heads and driving boxes, the best form of piston packing and the packing of piston-heads.

Mr. Stevens said: On the Lake Shore our practice has been to use iron, although we are not wholly wedded to that, and from what information I can get I think steel is decidedly preferable. As near as I can learn steel gives anywhere from 40 to 60 per cent more wear than iron does, to say nothing of the increased safety from the greater tensile strength of the metal. It has been the practice of the road to use steel exclusively for cross-heads, and there has never been a case yet where one has broken. They have given the best of satisfaction, and they have been replaced where cast-iron constantly failed. As to rocker-arms, we have had only a short service with cast steel, and for piston packing we use, as I guess the majority do, the Dunbar packing. I do not hesitate to say whose packing it is, because I believe the patent has expired. In some cases it has been known to run as long as fourteen years before renewing.

Mr. Cooke: As far as my experience goes with steel for piston-rods, I do not think much of it. I found steel ones in some engines I took charge of, and they broke square off at the cross-head; and we have been putting in iron, and get much better results. As regards the cross-head, we are using steel, and get grand results from it. For rocker-arms we are using mostly cast-iron. I would like to hear from some of the members about material for wrist-pins. I am having more trouble with wrist-pins on Mogul engines than with anything else.

Mr. Forsyth: What kind of steel do you use for pistons? A great many roads take old steel axles for pistons, and if they are not properly annealed they are hard and easily broken.

Mr. Cooke: I don't know what they were made of. We make iron pistons and forge them ourselves, and when we get them in we have no trouble.

The following communication from Wm. E. Smith, of Pittsburgh, was then read:

PITTSBURGH, JAN. 14, 1885.

Wm. Forsyth, Sec'y Western R'y Club:

DEAR SIR: Your favor is received, for which please receive thanks. You are welcome to our superintendent's views on the points of discussion if it will interest you. The best material for piston-rods we consider to be steel, as it has no fiber, lasts well, is not easily corroded, and is not too high in price. For cross-heads and rocker-arms, we regularly use cast iron of special tough, close mixture. We have used steel castings for cross-heads and they are stronger than cast iron, but we think do not wear so well [here is an illegible interlineation] and will cost more. We have used wrought iron for rocker-arms, but it does not wear so evenly, and any accident strong enough to break a cast-iron rocker-arm had better break it instead of damaging the much more expensive link motion. Our form of piston-packing is the simplest and best that we know of. The heads are cast solid, except they are cored out inside to make them lighter. Each piston head has two grooves in it into which the piston rings are sprung. We bore the hole for the piston-rod taper and rivet the end. We consider this better than using a nut. The special feature about our modification of this general style of packing is, that we take a cylindrical pot of larger diameter than the finished rings, and large enough to make six or eight rings. We cut out pieces from this and clamp the casting together, and turn up to a true circle and then cut off the rings. This secures a packing turned to an absolute true circle, and yet always pressing out against the cylinder equally at all points. We have had rings of this kind running for over two years in a shifting engine with very hard service without any attention whatever. We use a special quality of cast-iron for these rings. Very truly yours,

WM. E. SMITH,
For H. K. Porter & Co.

Mr. Stevens: I would ask Mr. Forsyth what his practice is on the Burlington road as to the material for piston-rods and packing used for pistons?

Mr. Forsyth: We use steel piston-rods and Dunbar packing. The material for cross-heads depends a great deal upon the form of the cross-head. If you have the old four guides, it is well to make them of cast-steel; if you have two guides that are wide apart, the center can be made of wrought iron and the gibs of cast iron or brass; and if you use the Laird guide, the body had better be made of cast steel and the sliding-block of cast iron. There is no general rule as to material for cross-heads. It depends upon the shape of the cross-head, but I think the metals I have named are the best for those particular forms. This letter, from Porter & Co., refers to the steel castings for cross-heads not wearing so well as cast iron, but that objection is easily overcome by putting in brass or cast-iron gibs, and in that way you get a good wearing surface.

I have prepared a short note on piston-rods, as follows: A locomotive piston-rod is subject to more severe service than any other part of the machine. The alternate thrust and pull for each revolution of the driver causes alternate and equal tensile and compressive stresses. The factor of safety proper for the material to resist either of these stresses, is only half that required when it is subject to both. In addition to the matter of strength, the rod must possess sufficient rigidity as not to bend when subject to the load of the initial pressure on the piston-head. The piston-rod has also a wearing surface on nearly the whole of its length. For these reasons, I say that as a vital portion of the engine it performs its function under the most unfavorable conditions, and the best material suited to these conditions should be used regardless of cost. The elastic, tensile and compressive strength of steel is nearly twice that of wrought iron, and if these qualities only were to determine the size of the rod, we could make a steel piston half diameter of an iron one, but when the diameter is less than one-twelfth the length, the tendency to bind or buckle is greater than the tendency to stretch or crush; and when the diameter is calculated for this, we find a steel piston should be nine-tenths the diameter of an iron one, and it will consequently have 81 per cent the weight of an iron one. The strength and rigidity of steel being greater than iron and having greater hardness and uniformity, it will wear longer, and is therefore the best material.

Mr. Stevens: What is the practice on your road of securing the piston-head to the rod?

Mr. Forsyth: It is a taper fit, pressed on, and there is a round nut put on and a round pin. (Mr. Forsyth exhibited a diagram of piston and piston-head.) In regard to Mr. Cooke's trouble with crank-pins, the whole matter resolves itself into one—to meet certain conditions with a material which has sufficient strength not to break. The elastic strength of steel before it begins to bend or stretch is nearly double that of wrought iron—that is, soft steel; so it seems to me there is no question but what steel is the best material for crank-pins, and where steel has been found to break, either in crank-pins or piston-rods, I think it was because the steel was not of a quality suited to the conditions of the service. It has been made too hard.

Mr. Cooke: I have come to the same conclusion with Mr. Stevens, and have commenced boring out my driving hubs where the crank-pin goes in, to five inches where the hub will admit of it.

Mr. Forsyth: On piston-rods there should be a double factor of safety, because the piston-rod is subject to alternate tensile and compressive strains at every revolution. There should be a factor of safety of, at least, ten.

Mr. Stevens: Is it a fact that you do get ten? Is it not a fact that the majority of piston-rods, as they are fitted, will run below five?

Mr. Forsyth: I suppose you refer to the weakening of the rod when the key——.

Mr. Stevens: Take the weakest part of the rod.

Mr. Forsyth: I should proportion it for that factor. I think with three-inch pistons you have about that.

Mr. Stevens: How do you fit your piston-rods at the cross-head?

Mr. Cooke: With a fillet. We are not very particular about the radius, except to get a good fair fillet. The fillet is small. We don't want a square corner. Where do you call the weakest place in that piston?

Mr. Stevens: The back end of the key-way, although I think we have broken more at the front end of the cross-head than at any other place. At the same time, in making a calculation of the rod, I should make it at the back end of the key-way.

Mr. Forsyth: I should say, then, there was something wrong with the guide. The piston must bend. If it was a direct pull, it would break in the key-way. It must be a bend to break it at that shoulder.

Mr. Cooke: They would not run long bent. But we don't have any iron ones break anywhere.

Mr. Stevens: My theory is that there is a vibration on that rod which in time produces a crack. If the guides were all the time in contact with the cross-head, I don't think there would be any difficulty.

Mr Forsyth: We have had a number of steel piston-rods break in the key-way because the steel was too hard.

Mr. Edgerly: As far as piston rods are concerned, if they are made and fitted properly I do not think any of them ought to break. I can not remember of any breaking without some imperfect workmanship. The keys sometimes break if they are not properly fitted up. As to material, I would not take an iron rod as a gift, would not use it if I could get steel. We grind the cross-head and piston-head and take as much care as we possibly can in making the fits of the key-ways, and I never saw one that broke. As for rockers, we use wrought iron. I do not think there is any particular point gained in making them of cast steel, and the use of a cast-iron rocker, I think, is a great mistake. We are using exclusively the Dunbar packing. I think it depends a good deal on the fitting. We have dispensed with holes in the front and back because we had to bore them too often. We turn them to a perfect fit, and find that they work perfectly. We have crank-pins made of crucible cast steel. There is no trouble about crucible steel holding. If it is properly handled and worked, there will be no breakage. That is our experience.

Mr. Stevens: How do you secure the spider or piston head to the piston rod?

Mr. Edgerly: After turning we grind it and drive it what it will stand with a common heavy hammer or sledge, and hold it with a key.

Mr. Stevens: I fully agree with some of Mr. Edgerly's remarks and with some I do not. When a thing gives out, of course it is as he says. There is something wrong, but I think we ought to be able to demonstrate in some way what is required. I suppose the only way that we can get at this is by a free expression on the part of all of us. The companies want the best for the least money, safety and durability being the considerations. I know how annoying it is, as well as expensive, for piston rods or any of their connections to break. Before my predecessor on our road adopted steel cross-heads, every little while one would break and away would go the cylinder head, perhaps both of them. There is nothing that has been put into our engines that has afforded us so much relief as those steel cross-heads.

Mr. Forsyth: The rolling of wrought-iron gives it qualities very much like steel; that is, it increases the hardness and strength, and these are two desirable qualities which make it more suitable for piston-rods than ordinary wrought-iron. Whether they are equal or superior to steel I am not certain. The life of a piston is probably limited by its diameter. When it gets worn to such a diameter that it is not safe to run, it must be thrown away, and I think this wear is very much greater with the old hemp packing than with metallic packing. On our road, with Jerome packing, the wear is very much less than with the old hemp packing, and I think metallic packing has done more to increase the life of pistons than anything else.

Mr. Wilson: I would like to ask if any of the gentlemen are using any steel driving boxes, and what their experience is?

Mr. Stevens: The Lake Shore is using a number of them, so far with good success. I have heard in some cases that they were apt to cut on the hub of the wheel; perhaps there is some one here who can give us some information regarding that.

Mr. Cooke: We sometimes have trouble with cast-iron boxes chafing. The two metals, cast-iron shoe and cast-iron driving boxes are acknowledged to be the best wearing metals we can get for that service.

Mr. Forsyth: Cast iron and cast steel will work very well.

Mr. Cooke: I make all my own piston rods, and then know what I have got. I think one of them will kill three steel piston rods such as Mr. Edgerly uses. We make them of piled up scrap, drawn out under a steam hammer. I never had any break nor bend since I commenced, five years ago.

The subjects for discussion at the next monthly meeting will be Standard Freight Car Trucks, and Balance Valves for Locomotives.

Adjourned.

Railway Master Mechanics' Association.

The following circulars of inquiry have been issued by committees:

LOCOMOTIVE IMPROVEMENTS.

Your committee, to whom was referred the subject of "New plans of construction and improvement of the locomotive," respectfully request your co-operation in furnishing to them any information you may have bearing on this subject, in the line of the following questions, viz.:

1. Have you made any improvement in locomotive boilers or fire boxes?
2. Have you designed any new plans or built any locomotives other than what are now considered as standard? Please furnish tracings of same.
3. Have you made any improvement in the manner of lagging locomotive boilers, or the covering of any parts heretofore exposed? Please furnish details of same.
4. Have you made any changes or improvement in locomotive frame pedestal, braces, etc. Please furnish detailed plan of same.
5. Have you effected any improvement in the construction of engine and tender trucks? Please furnish tracing, showing details of same.
6. Have you made any changes in plan of making cross-heads, tending toward improvement of same?
7. Have you made any improvement in manner of supporting and securing the boiler to the frame of the locomotive, other than the usual pads or braces? Please furnish tracing showing details of same.

The committee will be pleased to receive photographs, tracings or blue prints of any improvements you have made or have knowledge of that will be of interest and benefit to the association.

Very respectfully,
WM. WOODCOCK,
G. W. STEVENS, } *Committee.*
A. W. SULLIVAN,

Please send your replies, prior to April 15, 1885, to Wm. Woodcock, master mechanic Central Railroad of New Jersey, Elizabeth, N. J.

MATERIAL FOR LOCOMOTIVE BEARINGS.

Your committee on "Best metals for locomotive bearings," solicit answers to the following questions:

1. What has been your experience with metals used on engine and tender journal bearings? Also on connecting-rods and other parts of the locomotive?
2. Have you used journals lined with lead or any other soft metal? If so, with what results?

Please give composition other than lead. Also sketch, showing shape and dimensions of bearing; number of square inches of bearing surface; weight carried on journal and kind of lubricant used.

Give weight of bearing when first put in, and loss of weight to each 1,000 miles run. Also length and diameter of journal and loss in diameter from wear.

3. Have you knowledge of any composition that answers the same purpose as Babbitt metal in connecting-rods, etc., that requires a higher degree of heat to melt from friction, than Babbitt? If so, please give composition.
4. What kind of metal, in your experience, has given the best results for driving shaft, engine truck and tender journal bearings? If an alloy, please give composition, dimension and shape of same. Also method of fitting bearings in the cast-iron box or shell.
5. Have you found the inserting of "Babbitt metal" in journals an advantage? If so, to what extent? Please explain method of inserting.
6. What metal have you found to give the best results for connecting and parallel rod bearings? What advantage, if any, is there in a solid bushing instead of the square bearing fitted in straps? Is "Babbitt" a benefit or otherwise in connecting rods, and how should it be inserted?

In answering the above please do not confine yourself to the questions, but give any information that may be of interest or throw light on the subject. Send sketches or blue prints of bearings and boxes found to have given good results, and the weight carried on them.

Send replies to Jas. M. Boon, Frankfort, N. Y., before April 15, 1885.

J. M. BOON,
J. S. GRAHAM, } *Commitee.*
J. P. HOVEY,

AN improvement in the mode of casting car-wheels is said to consist in affixing to the desired portions of the outer surfaces of the cores of the mould, by suitable adhesive compositions used in foundry work, about half a pound of very finely powdered ferro-manganese having a large per cent. of carbon and silicon in its composition. This is allowed to be melted by the molten iron which comes in contact with the ferro-manganese when the mould is being filled, and being thus melted, the ferro-manganese is diffused through the hub and inner parts of the wheel, thus modifying the chilling qualities of the iron forming those parts, and preventing the same from being too hard and rigid. A substitute for the ferro-manganese is very finely powdered spiegeleisen, having in its composition a large per cent. of carbon, silicon and manganese.

Rail Sections and Flange Wear.

We copy from the *Railroad Gazette* the following communication contributed to that paper by a writer who has evidently given the subject to which it relates very careful attention. He sharply controverts, as will be seen, the arguments and conclusions embodied in the elaborate paper on the "Relation of Railroad Wheels and Rails to Each Other," read by Mr. M. N. Forney at the last annual meeting of the Car-Builders' Association. The facts presented in that paper and the deductions therefrom were not formally adopted by the committee on sharp flanges or by the association, but the action taken upon it was equivalent to its adoption and an endorsement of its conclusions. What the relative forms of flange and rail sections should be is evidently a very difficult matter to determine by actual demonstration, and we therefore venture no opinion as to the merits of the issue as between parties so capable of maintaining their respective views. The paper of Mr. Forney has been widely circulated, and railway men, and especially car-builders, will be interested in any attempts from other sources to throw additional light on the problem. The communication is as follows:

To the Editor of the Railroad Gazette:

It is to be hoped that the Master Car-Builders' Association as a body does not reach its conclusions in so incautious and ill-considered a way as have certain prominent members of that association in urging an important change in the customary form of rail section, against the too ready acceptance of which as a reasonable and defensible demand it is proper that a caution should be entered.

In protesting against hasty tampering with established practice I consider myself under no obligation to establish affirmatively the correctness of that practice, and still less to prove that the proposed remedy, instead of doing good to either rail or wheel, will in fact do harm to both, although the attached diagrams will show in brief how strong is the *prima facie* case to that effect. It clearly rests with those who propose a change to affirmatively prove the expediency of a change.

Many hundreds, if not thousands, of more or less capable men have tinkered with rail sections in the last fifty years, including, no doubt, a great many foolish men, but also including a great many able and competent men, fitted by their training to consider the subject from every side. The all but unanimous conclusion heretofore has been that sections more or less closely resembling Figs. 1–3, *i. e.*, having the corner of the rail of a shorter radius than the inside angle of the flange, were the proper form.

Recently, however, a committee of the Master Car-Builders' Association, consisting of Messrs. Stanley Goodwin, R. C. Blackall and John W. Cloud, have condemned this form of rail, stating that they were "strongly of opinion" that it was "*by far* the greatest cause of sharp flanges," and recommending that the rail be rounded off to a radius of ⅝ in. so as to exactly fit the flange, as in the section shown in Fig. 5 (which, however, is only ¼ in. radius). The conclusions of a previous committee that sharp flanges were due to special defects of trucks and wheels, bad gauge of wheels, trucks not square, wheels not the same diameter, overloading of side bearings, unequal loading of car, imperfect chilling, etc., etc., are passed over as quite secondary causes.

Immediately thereafter, Mr. M. N. Forney, Secretary of the Association, took up the matter in an elaborate paper presented at the 1884 convention, information for which was gathered by circular in the name of the Association, and which was (in effect) indorsed and accepted by the above committee as giving their views and relieving them from the necessity of making a separate report.

This paper has been very widely circulated. Officers of maintenance of way were formally invited to attend and take part in its discussion, and it may properly be considered (at least I think it is in fact so considered), as the presentation of the case which the car-builders have to make against rail sections; a kind of *quasi* official protest on their part against the carelessness of rail men in designing sections so as to cut wheels all to pieces.

Such a case is obviously entitled to a hearing, but as it also obviously has an enormous presumption against it, it is eminently proper to point out, as alone enough to condemn the paper referred to *as a basis of action*, that not only does it prove no case at all against the rails, *but it does not even attempt to.* In the whole 35 pages of the paper there is nothing bearing upon *how* and *why* the common form of rail section (Figs. 1–3) is harmful to wheels than that recommended in the paper (Fig. 5) than the following few lines (page 7), in which the fact to be proved is taken for granted as self-evident:

"As the maximum weight carried by car wheels is now from 5,000 to 8,000 lbs., the bearing surfaces must be subjected to pressures of from 40,000 to 64,000 lbs. per square inch. It is therefore not surprising that they are rapidly worn away, as *there is no principle in mechanics more firmly established or more certain than that the wear of surfaces in frictional or rolling contact is in inverse proportion to their area.* THEREFORE if we should increase the area of the surfaces of the wheel and the rail which are in contact, the capacity of both for resisting wear will be increased. *To do this their forms must be made to conform to each other.* In other words, *the treads and flanges of wheels should be made of the same shape as the heads of the rails.*"

This has a plausible sound, but—besides the inherent improbability that truths so self-evident that they may be taken for granted have escaped recognition for fifty years—it needs no great care to see that there is a gap in the logic big enough to drive a coach and six through.

As respects *rolling contact only*, or as respects "frictional" or *rubbing contact only*, the proposition that increase of the bearing surface will decrease the wear may be admitted as self-evident, but when to increase the bearing surfaces in *rolling* contact we add new surfaces in *rubbing* contact, it is anything but "firmly established" or "certain" that we shall decrease the wear. In fact, it would seem a strange proposition to advance as even a probable result, and most assuredly requires to be established affirmatively and not taken for granted.

It needs but a glance at the proposed new section, Fig. 5, to see that, since every point on the line of contact is at an unequal distance from the center of the wheel, only *one point* on it can be in

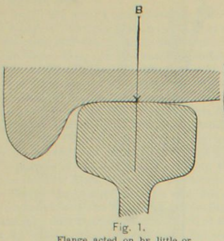


Fig. 1.

Flange acted on by little or no lateral force, but as close to rail as its form permits without such force.

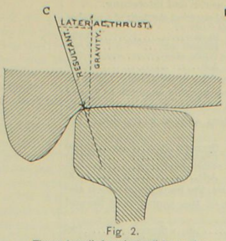


Fig. 2.

Flange impelled against rail by *moderate* lateral force, as by impacts on tangents. (*C* gives line of pressure, perpendicular to bearing surfaces in contact.)

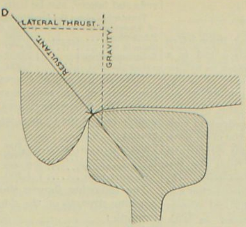


Fig. 3.

Flange impelled against rail by *strong* lateral thrust, as on outside rail of curves. (*D* gives line of pressure; wheel rises till bearing surfaces in contact are perpendicular to *D*.)

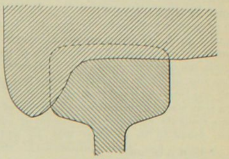
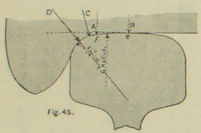


Fig. 4.

Worn outside rail on curves. Worn so that rail and flange "conform to each other," as (in fig. 5.)

Position of Wheel-Tread on Rails of Present Standard Forms when Forced Against Rail as Closely as Form of Flange Permits, by Varying Lateral Pressures.



Showing position of rail and wheel under any one of the conditions. figs. 1–4. (*Direction* of lines of pressure, *B, C, D*, only varies; flange always in same relation to wheel as in fig. 4.)

Fig. 5.

Proposed New Standard Rail Section.

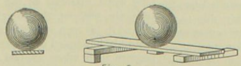


Fig. 6.

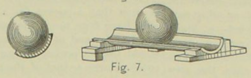


Fig. 7.

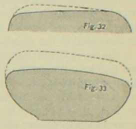


Fig. 8.

rolling contact; *every other point is continuously sliding on the top of the rail.* A simple computation shows that a differene of *one seventy-fourth of an inch* in the radius causes that point to slip as fast on the rail as the outside (or inside) wheels must in passing around a one-degree curve! In Fig. 5 we have an extreme difference in radius of about one-half an inch, so that the extreme point of the line of contact would be slipping as fast as the tread would on a *thirty-seven degree curve*, assuming all the slipping to be on one or the other rail.

This *may* be a good and wise way to reduce friction and wear, but a little proof of that fact would come in appropriately. Instead of this we find that the remainder of the paper (so far as it bears on this subject), although it has the appearance of a detailed investigation, adds nothing more in reality to the discussion than the matching together of a lot of rail and wheel sections, and showing that they do not fit, "saying in a solemn way an undisputed thing!" We all know that they don't fit; what we want is proof that they ought to fit.

Another palpable omission in the discussion is the absence of any attempt at a *diagnosis* of the disease to be cured before attempting to cure it; some attempt to determine its comparative extent and importance, lest in trying to save 10 per cent. of one dollar we lose (even if we succeed) 5 per cent. of $100. A natural impression for a maintenance-of-way man to derive from the action which has been taken is that there is some fearful loss from sharp flanges, imperatively needing a remedy. Absolutely, no doubt there is a great loss, and it comes so immediately under a car-builder's eyes that he naturally feels as if it must be stopped somehow; but comparatively it would appear to be one of the smallest of small items, not such as would warrant an appreciable deduction from the life of rails to save the whole of it.

According to the United States Census (1880),

Renewals of rails cost 4.41 cents per train mile.................. 4.41
All repairs of cars cost { freight..........5.80 / passenger.......2.71 .... 8.51

How much of car repairs is due to renewals of wheels is an open question. It may perhaps be assumed to be certainly less than one-half, and certainly over one-quarter of freight-car repairs, and a very much less proportion of passenger-car repairs. Allowing 40 per cent. if freight-car repairs and 15 per cent. if passenger-car repairs as due to maintenance of wheels would make the *total* cost of wheel service only 2.73 cents, against 4.41 cents for rails; but as the latter may well be larger than it will be when all iron is renewed with steel, we may admit that with the advent of steel rails the total cost of wheel service is somewhat more than rail service, perhaps 50 per cent. more.

But of this total an insignificant fraction is due to flange-wear. Without attempting to determine it with any precision from the mixed, scattered and imperfect statistics available, it is not claimed, I believe, that more than about 8 per cent. of the wheels are removed for flange wear on any large road, even the most crooked. Many crooked roads report only 1, 2 and 3 per cent. The Lehigh Valley, *on which this new cure-all has been in operation for many years*, reports 4 per cent, while such roads as the Boston & Albany, which is also a crooked line, and has not this advantage, reports less than 1 per cent. Mr. Leander Garey has recently stated that *ninety per cent.* of all wheels removed are for cracked plates, leaving the remaining 10 per cent. to be divided up among half a dozen other causes, of which sharp flange is only one, and a minor one. Out of 86 wheels of the Michigan Central (Master Car-Builder's report, 1880) only *one* had a worn flange, and out of 19 on the Grand Trunk (which claims to have especial trouble) only *two.* Altogether, it would probably be a fair estimate that 2 to 3 per cent. only of all the wheels condemned in the United States are for sharp flanges, and an extravagant estimate to say 5 per cent.

But now comes in an element that these gentlemen seem to forget. The percentage condemned is nothing to the purpose: the question is, How much *mileage* is lost? Now, I am informed that wheels removed for sharp flanges have almost invariably made a fair, and often a high mileage, and that the average falls little below that of wheels removed for worn tread or other like causes. Out of 42 wheels given in the 1881 Master Car-Builders' report, 8 were for "sharp flanges"—an unusually large number; but the force of this fact is wholly destroyed by the fact that *their average mileage is considerably higher than that of wheels removed for any other cause, even the general one, "worn out."* Altogether it probably cannot be shown, as it certainly has not been shown, that there is any considerable *mileage* loss from sharp flanges at all, but to estimate it at 10 per cent. is—for any facts which as yet appear to the contrary—a liberal estimate.

This leads to the truly impressive conclusion that the loss which we are asked to tamper with rail sections to save, amounts to 10 *per cent. of* 3 *to* 5 *per cent.*, or from *a quarter to a half of one per cent.* of the total cost of wheel service.

To effect this petty saving, what do these gentlemen propose to do? To round off the corner of all rail sections to a ⅝-in. radius, instead of, say, a ¼ or ⅜ radius, the effect of which, as a little mild arithmetic will show, is that if we assume that their new proposed rail sections will stand 10 lbs. wear on the head, by using

¼ in. radius for ⅝ in. we add 14 08 p. c. to wearing section and life.
" " " ½ " " 8.05 " " " " " "
" " " ⅜ " " 3.35 " " " " " "

Cutting off *ten or twelve per cent.* from the effective wearing section of rails to save less than *one* per cent. of wheel mileage is rather a dear way of curing flange-wear, even assuming that the proposed remedy will cure it and bring no other and greater evils in its train!

In other ways the ill-considered and incautious way in which conclusions have been jumped at in this matter is evident. Copying Mr. Forney's words (it is to be hoped with better warrant for using them), we may say that "there is no principle of mechanics more firmly established or more certain" than that the same cause, acting in the same way, at the same time, upon the same bodies, will produce the same effect. When, therefore, we find that, although all wheels run over these wicked rails, yet only 3 to 5 per cent. of them get sharp flanges, what probability is there that the form of the rail, which acts upon *all* wheels, is the real cause of this small loss? Is it not clear that the true cause must lie in defects special to the individual trucks and wheels which suffer—defects which it is the car-builders' special duty to study and correct—instead of in the rail sections, which it is well that they should study, but which it is beyond their power to correct?

Another fact shows the unwarrantable "previousness" of this charge against rail sections still more clearly: It is practically *an invariable rule that only one wheel on an axle has a sharp flange.* At the 1883 Master Car-Builders' Convention, Mr. Richard Williams, an English visitor, who talked much sound sense on this subject, which appears to have produced little impression, said: "I defy any of you to say you ever saw two sharp flanges on the same axle," and no one took up the challenge, except that Mr. Goodwin "thought" they were often found, although "not so common as one." Modifying Mr. Williams' challenge so as to except wheels which have rendered full average mileage before condemnation, the chances are strong that not a single instance can be found anywhere. Certainly, the exceptions are so rare as merely to prove the rule.

Another general fact increases the presumption against the proposed change. All examples of the *actual* wear of the rails and (in the main) wheels, as shown by the examples of *actual* wear, even in Mr. Forney's own paper (as Fig. 8) show that the rail naturally wears to a sharper instead of rounder corner, except on the outside of sharp curves, where it wears so as to "accurately fit the flange" (Fig. 4), as these gentlemen would have all rails do. Similarly, wheels usually wear to increase, and rarely to sensibly decrease, the radius of the flange angle, the two becoming more and more *different* from each other instead of more and more nearly alike. While this only raises a presumption against the proposed change, it is a strong presumption (*a*), because the laws of wear seem to be contrary to the assumed theory, and (*b*) because, even if the theory were correct, the natural wear would soon bring the sections into substantially their present forms.

Reverting now briefly to the case in favor of the present form of rail section, we may say, perhaps, that "nothing in mechanics is more firmly established or more certain" than that in Figs. 1, 2, 3 we have the positions the wheel assumes with reference to the present established form of rail section, when from any cause it approximates as closely thereto as the flange permits; which is, perhaps, for one-tenth of the time (for any one wheel) on tangents and exactly one-fourth of the time on curves, the outside front flange only crowding hard against the rail. It will be seen that the bearing surface is as nearly as may be *purely rolling surface* in every case, there being a minimum of rubbing surface. Nevertheless, some rubbing takes place, of course, and with it wear, but I believe it to be now easily demonstrable from known facts that *practically the whole wear in such cases as Fig. 3, on curves, is due to the longitudinal slipping only.* This, however, is very great, and under heavy traffic speedily produces the condition of things outlined in Fig. 4, in which the fit between rail and wheel is even more perfect than our friends' ideal section, Fig. 5, taken directly from Mr. Forney's paper! Of Fig. 4 we may fairly say that "the villainy they would teach us we have executed, and it has gone hard but we have bettered their instruction." Nevertheless, Fig. 4 is not generally regarded as an ideal form for a rail section; but if the assumption made in this paper is correct, that the nearer the flange and wheel fit each other the less wear and friction, *then the rail and flange-wear on a worn outside rail, Fig. 4, should be less than on a new one, Fig. 3*; or, what amounts to the same thing, a heavy globe, Fig. 6, rolling down a plane surface, should have its friction and wear decreased instead of increased by rolling in a trough, Fig. 7, so formed that it could "bear" (*i. e.*, rub) all around its circumference! If there be any one to whom such a proposition is not self-evidently absurd, it may be added that statistics now place it beyond reasonable doubt that the wear of outside rails in curves is *several times* greater when they have worn "to fit the flange" (Fig. 4) than when they are new and do not fit it (Fig. 3).

These facts certainly indicate, and to many they will perhaps seem practically to prove, that the proposed change will very materially increase rail-wear on tangents to something like what now exists on easy curves, and have a still worse effect on curves, by hastening the period when the flange cuts deeply into the rail-head. If so, it will also appreciably increase rolling friction and train resistance on both curves and tangents, and it will undeniably (compare Figs. 1–3 with 4–5) increase somewhat the ease with which a flange, especially a defective flange, can climb a rail and cause derailment. Adding to this the admitted effect that the material in the rail-head available for wear is diminished, and that whatever increases rail-wear increases wheel-wear, we have a case which requires something more than assumption and guess-work to disprove, and which it would be the height of imprudence to disregard, by such an important action as a radical change in rail section, until it has been disproved.

Other points in this matter invite discussion, as, for instance, the rough-and-ready way of computing the crushing pressures and assuming their effect without consideration of the laws of elastic compressibility, which is certainly unsound; but enough has been said. Had the paper given merely the hasty conclusions of an individual, a shorter discussion or none at all might have sufficed; but as it comes before the railroad world, owing to the circumstances detailed, with all the force of a careful, deliberate and well-considered demand by the car-building interest for the reform of an intolerable, or at least great evil, it has seemed essential to point out in detail that the demand is neither careful nor deliberate, nor well-considered, nor (probably) founded on any sound basis of fact or theory.

C. E.

A VERY successful trial of the Laufman Screw Brake was recently made at St. Paul, Minn., in the presence of a number of railway men, who expressed the opinion that for general effectiveness it was the best hand-brake they had seen. Stops were made at all rates of speed in a much shorter time than with the ordinary chain brake. It is understood that the Northern Pacific Co. will give the brake a thorough practical trial with a view of putting it on a number of their trains.

Car Framing.

(Concluded from March number.)

With respect to holding up the ends of a car, the relative value of a truss or brace as compared with a rod is a matter of some importance. As a mere question as to how much strength is needed to do a given amount of work, an engineer would probably say that both methods are equally good. In actual practice, however, this does not appear to be the case. The inspection of hundreds of cars within the past year shows that in all cases the ends have been kept up better by braces than when the downward pull was taken by a rod running diagonally from the top of a post placed directly over the point of support. On some roads the weakness of this form of construction has been found to be so great that an additional system of bracing has been introduced. Braces in both passenger and freight cars may safely be said to be superior to rods for transmitting a strain in a diagonal direction, as from the car end to the bolster. A reason for this it is not easy to give, the fact being due to various causes. Where the ends are supported by a rod rising from the ends and passing over a strut on the bolster, and along the window rail to the opposite bolster, the difficulty in keeping the ends up is probably due to the expansion and contraction of the iron, which is very much greater than that of the wood. Another and more common cause is the insufficient size of the washers. The small washers pull into the grain of the wood when the strain comes upon the rod. This allows the end, or other part to be supported, to drop down. When a brace is put in, especially if it is a long one, a good size is necessary to secure the requisite stiffness. When such a brace is seated in a pocket at both ends, the area presented to the timbers against which it rests is very much greater than that of any washer which would be used on a rod put in at right angles and intended to do the same work. In probably nine cases out of ten this is the cause of the failure of the rod to do its work. The few builders who have used large washers appear to have less trouble than those who adhere to the small sizes. As a stiffener, the counter brace, from the bolster to the end, cannot well be dispensed with, nor can its place be taken by any other form of construction.

This brace appears to be quite as valuable in passenger as in freight cars. In the latter cars, built with rods running downward toward the center, the ability to carry the weight may be quite equal to those put up with braces and counterbraces. Their weakness, however, becomes manifest when they are put in service. The momentum of the superstructure so rocks the body as to destroy it rapidly. If the braces are gained on to rails and posts, or are cut in with knife-joints, the stiffness of the body frame is much increased. This is, perhaps, of more value in passenger than in freight work, but even in the latter the good results of such construction can be easily traced in looking over a thousand cars in large freight yards. The general use of green timber for freight cars in some sections of the country, prevents the full value of the brace from being obtained, yet its large bearing surface, and its rigidity as compared with a rod, makes it preferable. The number of the braces used should be as few as possible, the rule being to make as few joints as possible. This rule is a general one, and applies to all wood constructions, where joints are in all cases the weakest part and should be avoided. One counterbrace in the end of a freight car is better than two, as it carries the strains more directly. On some accounts one brace from bolster to doorpost would be advisable, as doing the work in the most direct manner. There are, however, other strains to be resisted which makes an intermediate post needful. In a passenger car, the bracing is sometimes so put together that it has no more stiffening effect than so many rails. This may be avoided by putting in iron bearing seats at the joints, or by seating the braces in pockets. This reduces the battering of the wood-ends to a minimum. The crippling or battering of joints is a serious cause of weakness in all car framing, and should be reduced when possible by the use of pockets. There is an additional advantage which may be obtained by pockets. This is the cutting of all braces with square ends, which gives the end of the brace the greatest resisting power, and at the same time the pocket gets a large bearing surface on the timber.

The insufficient sizes of the washers used on brace-rods has already been noted. The same insufficiency of surface exists in all washers of small or large rods in most cars. Probably those who question the value of a body truss-rod, do so from the fact that these rods have proved useless to carry the weight of the car. The failure can in most cases be traced to the inability of the washers to stand the strains to which they are subjected. If we take the case of the smaller rods, the insufficient size of the washers is equally apparent. Practically, a ½-inch rod is strong enough to pull the washer of a ⅝ bolt into Georgia pine.

So far, only a general consideration of the relative usefulness of rods and braces has been made. An examination into the nature of the materials employed in car construction is essential to a clear comprehension of the differences in value between one style of framing and another. A few figures, therefore, in regard to the strengths of woods will throw much light on the respective merits of rods and braces, and be both useful and interesting.

Trautwine gives the longitudinal crushing strength of a number of American and foreign woods as follows:

Pitch pine	6,800	Spruce	6,800
Canada oak	6,000	English oak	9,500
Long-leaved, or Georgia pine	7,000 8,000	White pine	5,700
		Ash	8,600

These figures are, of course, only approximate, different specimens of the same wood varying as much as 50 per cent. The following figures give the force necessary to merely indent the timber, when applied to the side of the grain:

Pitch pine	1,700	Spruce	850
Canada oak	2,000	English oak	3,100
Long-leaved, or Georgia pine	2,000 1,700	White pine	710
		Ash	4,900

The following figures show the percentage which the crushing strength of the side of the timber is of the end strength:

Ash	.57	Locust	.3	Spruce	.125
Live oak	.67	White oak	.3	Chestnut	.2
Maple	.333	Cherry	.3	Whitewood	.25
Hickory	.333	Georgia pine	.25	Hemlock	.111

These figures show what proportion of the thrust which a post or brace can exert, may be safely sustained on the side of the grain. The brace or post is supposed to be of the same material as the stick against which it rests directly, without the intervention of a pocket. Tredgold found in his own experiments that yellow pine was perceptibly impressed by a pressure of only 900 pounds per square inch when applied to the side of the grain. Accepting the figures given by Trautwine as correct, it will be seen that a pocket for a Georgia pine post, or brace, must have four times the bearing on a plate of the same wood as the end of the brace would give. Ash on ash would need a pocket giving a bearing a little less than twice as large as that of the post or brace itself. Putting a spruce brace against a spruce plate would call for a pocket having eight times the area of the brace. From these figures it is not difficult to see that brace and post pockets are never made too large. In fact, the bearing surface could be increased to advantage in almost every case.

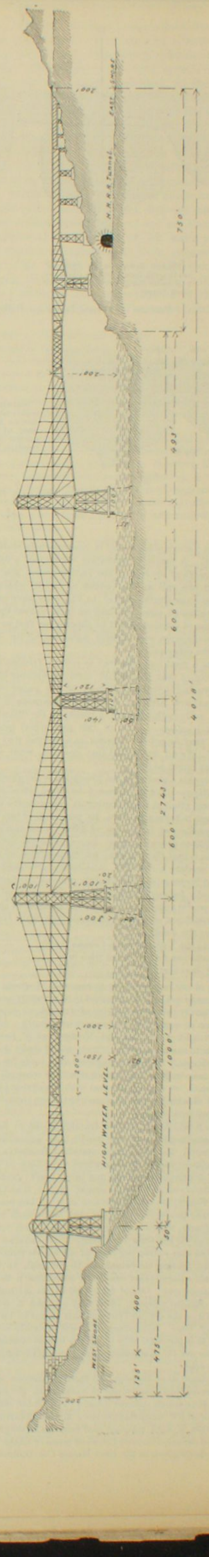
The above figures confirm in a very striking manner the experiments made some years ago by the master car-builders in regard to the strength of freight-car frames. In spite of these experiments and figures, which have been easily accessible to all, many hundreds of cars have been built within the last few years, in which rods with the usual size of washers have been substituted for braces. Without exception, so far as we have seen, the washers have been of much less area than the plain ends of the braces would have been. In some cases, where two rods start from the top of a post, the washer is less than double the size of the brace end. The bearing surface is not more than 20 per cent. of what it should be for locust, and not more than one-eighth of what is needed for Southern pine. It is not surprising, therefore, that cars built in this way have not given satisfaction, and have lost their camber after a little service. In some cases the owners have found more serious fault with them than any outsider would care to find. We have recently seen many cars where the washers were so small that they probably pulled into the wood when the wrenches were first put on to the nuts.

If car-builders will take pains to figure out the proper dimensions for pockets, braces and posts, they will generally find that they have been wasting material. In nearly all cases the braces will be found to be doing less work than they should do in supporting the car. The size of the braces and posts is in most cases determined by the strength needed for resisting the outward pressure of a load of grain. These being fixed, such a size of pocket or washer should be adopted as would enable them to be loaded to the limit of their capacity without crippling the plates and sills. Car bodies framed in this way have a superabundance of strength. The truss which holds up the car is then able to carry more than it is safe to trust on the running-gear.

The secret of the good performance of many of the Western cars is found in the fact that their braces are of large size and have ample bearing surfaces on both plates and sills. This has, in most cases, counteracted the bad effects of cheap contract building and green timber, and made the cars stronger and more durable than many others which were better built, but poorly designed in this very essential particular.

The Storm-King Bridge over the Hudson.

The construction of a railway bridge across the Hudson River at some point in the vicinity of Newburgh has been contemplated for many years in view of the immense advantages that would result from a connection of the extensive railway systems on each side, and which are now severed between New York and Albany. Many plans for such a structure have been presented from time to time by engineers and projectors of railway enterprises, but on account of difficulties pertaining to the length of spans, depth of pier foundations, rugged nature of the approaches, excessive cost, etc., they have all been abandoned as impracticable. The success of the cantilever system of construction, however, which has been so signally demonstrated in the bridge erected year before last by the Michigan Central Railroad Co. over the Niagara River, has rendered it apparently practicable to bridge the Hudson with



PROPOSED CANTILEVER RAILWAY BRIDGE OVER THE HUDSON RIVER OPPOSITE STORM-KING MOUNTAIN.

a structure of a similar kind, but on a much bolder and more gigantic scale.

The engraving gives a general outline view of the proposed bridge of this description to be erected by the Highland Junction Railroad Co. at the narrow point in the river between Storm King and Breakneck Mountains, just below Newburgh and about 55 miles from New York. The plan, as shown, has not yet been formally adopted and may be modified in some respects by the engineers of construction, yet in all essential features it conforms to the contemplated structure that will doubtless sooner or later span the river. The above named company was organized under the general laws of the State of New York, in 1881, for the purpose of building a railroad from Greycourt, a point on the New York, Lake Erie & Western, a few miles below Newburgh, to a point on the west side of the Hudson, to connect with the New York & New England on the opposite side, near Matteawan, the length of the line being about ten miles. The construction of the road along the base of the mountains on either side requires no tunneling or any very heavy work, and the grade is not to exceed 20 feet to the mile.

The width of the river at the bridge location is 2,743 ft., the depth of water varying from 92 ft. on the west side to 30 ft. on the east side. The total length of the bridge between shore abutments is 4,018 ft.; the grade level, height of tracks above high-water mark, 200 ft., and height of cantilever towers to the chord line, 100 ft. more. The first pier at the west end is located at the water's edge and supports a cantilever, one end of which is anchored to the abutments at grade, while the other supports one end of the fixed or center span of 200 ft. The next pier is located in 80 ft. of water, and sustains a cantilever with arms of 400 and 600 ft. in length, as shown. The next cantilever is of the same dimensions, the eastern arm meeting the fixed span of 125 ft. between it and the last cantilever towards the east. The rest of the structure at this end is of the viaduct type. The design is for a deck bridge with double track. The cantilever frames, which are 45 ft. deep at the ends and 60 ft. deep at the towers, are reinforced by three courses of chain or eye-bar suspensions carried up and into the towers, and upon which they take a bearing. The weight of moving load which the bridge is designed to bear is two tons per lineal foot of single track, to which is to be added as much more for wind strains and derailment of cars or engines, the factor of safety with these loads and strains being five.

The principal details and specifications of the structure may be stated as follows:

Total Length of Bridge and Viaduct	4,018 ft.
Width of Water Way on line of Bridge	2,743 "
Width of West Channel Passage in clear	920 "
Width of two Center Channel Passages, each	520 "
Width of Eastern Channel Passages	453 "
Length of Cantilever Arms:	
Four, each	400 "
Two, each	600 "
Two, each	150 "
Length of Fixed Spans between Cantilevers:	
One	200 "
One	125 "
Height of Rails above High Water	200 "
Height of Cantilever Truss Towers above Rail	100 "
Greatest Depth of Water	92 "
Size of Masonry Pier at High Water over Ice Breaker	80 × 160 "
Height of Masonry Pier above High Water	20 "
Height of Masonry Pier above Caisson Platform	80 "
Cubic yards of Masonry in Pier	43,800
Displacement of Water by Pier from Bed Rock to High Water Line in cubic yards	53,743
Size of Caisson at River Bottom	100 × 190 ft.
Height of Caisson Chamber	9 "
Thickness of Timber in Caisson Roof	20 "
Timber in Caisson B. M.	6,000,000 "
Static Weight of Pier complete, less displacement of Water	69,500 tons.
Pressure per square foot of Timber in Foundations due to Static Weight of Pier	3.86 "
Do. Due to all Weights of Superstructure, Load and Wind Strains—extreme limit	6.38 "
Size of Cantilever Towers at Base or Top of Masonry Pier	60 × 60 ft.
Do. at Top of Tower or Junction of Trusses	40 × 40 "
Approximate Weight of Cantilevers, Towers, Fixed Spans, Floor Timbers, Rails, etc., per Running Foot of Bridge	5 tons.
Approximate Weight of Bridge, including Viaduct and exclusive of Masonry	18,500 "
Approximate quantity of Masonry in Piers, Abutments and Viaduct—cubic yards	114,500
Estimated Cost of Bridge and 10 miles of Railway	$5,000,000

The bridge, when constructed, will afford a shorter and more direct continuous railway communication between the Pennsylvania coal fields and the New England States, by means of which consumers can order in smaller quantities and depend upon regular and continuous shipments at all times of the year, and avoid carrying large stocks of coal. The cost of transportation will also be materially lessened, as appears from elaborate statistics of rates by existing routes. We need not dwell, however, upon the direct and incidental advantages that will result from the construction of the proposed bridge at the point named, as they are sufficiently obvious. We are informed that the work has been placed under contract with responsible parties, and that operations will be commenced early in the present season.

IT is said that snow-drifts piled up by a northwestern blizzard in good working order, are as compact as a half-dozen copper plates hammered together. The wind throws the snow into a bank, and pounds it down with regular blows until it is so hard as to bear up a locomotive.

Communications.

Railway Track and Rolling Stock.

To the Editor of the National Car-Builder:

I have recently read an article by a prominent civil engineer, in which he urges the importance of strength, smoothness and solidity in the construction of railway tracks. To aim at perfection in this branch of construction is eminently proper, but, paradoxical as it may seem, it is possible to go beyond perfection. Strength, smoothness of surface, perfection of alignment and stability, are indispensable for a track adapted to the present requirements of American railways. There is no possibility of overdoing the work in these respects, but there is such a thing as excessive solidity. The writer referred to says, in urging the importance of great solidity, that a smooth-shod sled glides over smooth ice with no perceptible jar, vibration, or oscillation. This is very true, but the case is vastly different from rolling stock on a perfectly smooth track on a solid foundation. In case of the sled, there are no reciprocating parts, unbalanced wheels, counter weights, and no forces whatever to cause destructive vibration; whereas, cars and locomotives have all these to a high degree. But few car-wheels are truly balanced; every revolution gives a blow to the rail, and when nearly all the wheels under a train are pounding like so many sledge-hammers, it causes severe trembling and has a telling effect on springs, nuts, bolts, axles, etc. But it is the locomotive, with the heavy counterweighted drivers and shaky parallel rods, that suffers most from too great solidity. Every master mechanic knows that a shaft slightly out of line, or a pulley the least out of balance, will shake a machine shop, and the more solid the foundation the more perceptible will be the tremor. If a playing marble is dropped on a stone slab, it will rebound to a considerable height, but drop it from the same height on a block of soft wood, and the rebound is much less. The wood absorbs a portion of the shock and neutralizes the force that would cause the rebounding, the same as elasticity in a road-bed yields to the blows of unbalanced wheels and counterweights of rolling stock and prevents the reaction that causes the destructive vibration on track that is too solid and which it is desirable to avoid. There are not a few yet living who can recollect the granite ties that were used on some roads in Massachusetts, and were removed and replaced with wood. The stone ties were too solid, and rails and rolling stock went to rapid destruction. In rock cuttings and tunnels, and in places where track has been laid for some distance on surface rock, it has been found necessary to put sand or gravel ballast under the wood ties in order to save the rails and rolling stock.

Road beds are sometimes made of a material that unites with the ballast and forms a mass that solidifies and becomes nearly as hard as rock, and the effects of the excessive solidity are seen in the rapid wear of rails and shaking to pieces of cars and locomotives. Some of the oldest and best-kept roads in the country are raised from time to time about four inches in order to loosen the hard unyielding crust that has formed under the ties, and make a more elastic bearing. Heavy traffic soon makes a solid bed on clay or heavy soil when mixed with sand or gravel; and no matter how perfect the surface may be, it is the right thing to put new life into the ballast by occasionally raising the track a few inches, which restores the former elasticity. Those who would be at extra pains and expense to prepare the solidest, which means the hardest, road bed possible can readily see their error by riding over a road that has become solid, but upon which sections have been raised and the old bed limbered up. The newly raised sections will carry a train as smoothly as a sled runs on ice or a ball rolls on a billard table, but as soon as the hard, solid, undisturbed ballast is reached, vibration commences at once, even if the surface is as smooth and perfect as on the raised track.

An engineer recently secured a patent for permanent way, the main feature of which was the rail joints and their support. At the joints he places blocks of stone, three feet or more in height, and about 18 inches square on the top. These are imbedded in the road-bed to a sufficient depth to be below frost and surface water, and undisturbed by frost, water or traffic. This is surmounted by a heavy steel chair provided with jaws, bolts, keys, wedges, etc., to hold the ends of the rails in place. The intermediate supports are similar, but of more modest dimensions. The blocks are held in place by iron rods, and the rails are held to gauge by transverse rods, the latter being the only sensible part of the whole plan. Now that some of the trunk lines are preparing their tracks for heavier and faster trains and are casting about for improved methods of constructing permanent way, there is danger of their being led into serious mistakes by the reasoning of writers and inventors here referred to. If it were desired to build a permanent way that would destroy rails and rolling stock in the least possible time, no more ingenious plan could be devised, and those who are building new roads or making extensive repairs or renewals, will do well to guard against too much solidity of superstructure. Foundations and all substructions, and the road-bed proper, cannot be made too substantial and solid, but the immediate rail support must be provided with the requisite amount of elasticity, or there will be trouble and increased cost of maintenance.

Another engineer occupies much space in a railway journal with lengthy arguments and fine-spun theories to prove that the proper way to lay track is to "break joint" the rails. Theory may point out some advantages in this method, but practice proves that a perfect track requires the joints to be exactly opposite each other on straight line and radial on curves. Joints on one side opposite the rail center on the other, doubles the shocks given to rolling-stock by low joints, which are found to a greater or less extent on all American roads. When joints are opposite each other, they may be considerably out of surface and not cause any very disagreeable or damaging oscillation, but with broken joints only moderately low, cars and locomotives are rocked from side to side in a very disagreeable and dangerous manner, and on bridges the broken joints produce very destructive vibration. The practice is a bad one, and should be abandoned.

WM. S. HUNTINGTON.

Metal for Locomotive Bearings.

To the Editor of the National Car-Builder:

I have noticed in the different railroad journals an invitation to railroad officials and others, from the committee appointed at the last annual meeting of the Master Mechanics' Association, to give their experience and all information they may possess in reference to the best metal for locomotive and other bearings.

The subject is of great importance to railroad managers, and the invitation of the committee will, doubtless, elicit numerous replies both from a practical stand-point and otherwise. The whole inquiry, as it seems to me, hinges upon one point, which is this: What are the anti-frictional metals, and those that can be used in a combination or alloy? Copper and tin in certain proportions have hitherto been the best known metals for bearing purposes where high speed was not desired, but the requirements of to-day are very different from what they were twenty or thirty years ago.

We now run passenger trains at the maximum rate of a mile a minute, with increased weight in every respect, and we must have an anti-friction alloy if it can be produced. In our car brasses we are using a lining or filling composed to a great extent of lead and antimony. With this we obtain fair service, the lead furnishing the anti-frictional quality and antimony the hardener. This is all very good so long as there is no cause for the lining to become heated, but if heating occurs, then the load is dropped on the composition back of the lining, and if this gets hotter, it crumbles, breaks and welds to the axle.

In such case the question arises, Can there be a composition made of copper, tin and lead, or copper and lead, with sufficient strength to stand the hard usage? I mean the use of sufficient lead to make the composition thoroughly anti-frictional. I not only know that this can be done, but have recently been shown the process by which an indefinite quantity of lead has been amalgamated and thoroughly mixed and fixed with copper. I am very positive that lead is the one metal that will take the foremost rank and be the key to anti-frictional journal metal when alloyed with copper, and I would respectfully ask all to bear this in mind when they are wrestling with this particular problem. If it can be done every day alike, as I have seen it done, then this is the bearing metal to meet the requirements of the future.

M. M. LEADING, M. E.

PHILADELPHIA, March 16, 1885.

Camber of Cars.

To the Editor of the National Car-Builder:

Every railway man knows that a car body should have camber, but the reasons for it are not always clearly perceived. A car-builder was once asked why he built his cars with a camber instead of making them straight. The answer was, that he did not know.

That a car will sag more or less cannot be denied. But why it should be built so the sagging will bring the body structure toward the horizontal line instead of a little below it, is considered by some as a very puzzling question. Is not the true reason to be found in the fact that it is always desirable to get the body of the car as far from the center of the truss-rod as possible, thus making the truss as deep as is practicable? If the body is bowed above the general line the truss-rod will be placed at the greatest advantage, and will throw the least possible strain on the wood-work. In regard to vertical weakness, did anybody ever see a passenger car which had been broken down in the center in actual work? It is, of course, not supposed that any accident has happened, or that any special weakness has caused a giving out, but a break-down from actual wearing out. Such a case appears never to have been reported, and in all probability no passenger car ever did give out in this way. For this reason, many builders hold that a truss-rod is an unnecessary incumbrance, and that the car-body can be just as well supported without its aid. In proof of this, old cars are shown which have stood the wear and tear of years, and have never had a truss-rod under them. Their camber is still good, and inspection discovers no weaknesses which are not incident to cars of every kind. The general opinion, however, is in favor of truss-rods, and as they are very generally used in passenger work, they are undoubtedly advantageous, although their utility may be questioned in many cases, especially when the method of their attachment to the car-body is considered. There are many cars in service on our roads that would be stronger if the truss-rods with which they are incumbered were taken off, the reason being that the rods are put on in such a way as to add little to the self-sustaining capacity of the structure. CISCO.

A Good Separator Wanted.

To the Editor of the National Car-Builder:

Among other things which are very much needed by car-builders, is a good apparatus for separating dust and shavings from the air delivered by the exhaust fans which carry the shavings and sawdust from the planing mills to the boiler rooms. In some shops the boiler rooms are located in relation to the paint shops so that the latter have but little annoyance from the dust which comes from the separator, but in other establishments the dust is a serious nuisance.

I would like to have the experience of builders of passenger cars in relation to the construction of dust-rooms. Has any form of room or arrangement of apparatus been devised which will prevent the fine shavings and dust from flying about in the yards, and can exhaust fans be arranged so that the blast which they deliver after the sawdust has reached the boiler room will be free from particles which will do harm in the varnishing room? There are several devices in use for the purpose, but none that I have seen have been entirely satisfactory. Any information which you or your readers can give me on this subject will be thankfully received. W. H. G.

Annual Report of the Pennsylvania Railroad.

The report of the board of directors for the year 1884 shows a marked decrease in gross and net earnings as compared with the previous year. This, however, is not due to any material falling off in the volume of traffic, but to the reduction in rates of transportation. This was felt more directly by the lines west of Pittsburgh, these being more largely dependent upon through traffic and subject to the injurious competition with other lines. On the company's lines east of Pittsburgh and Erie, the percentage of falling off in the freight movement is very slight, while the number of passengers carried is greater than it was for either of the two previous years. A dividend of 7 per cent. was paid out of the earnings of the main line and branches, and a surplus of $419,733 carried to credit of profit and loss for 1884. We append the following summary of operations from the report:

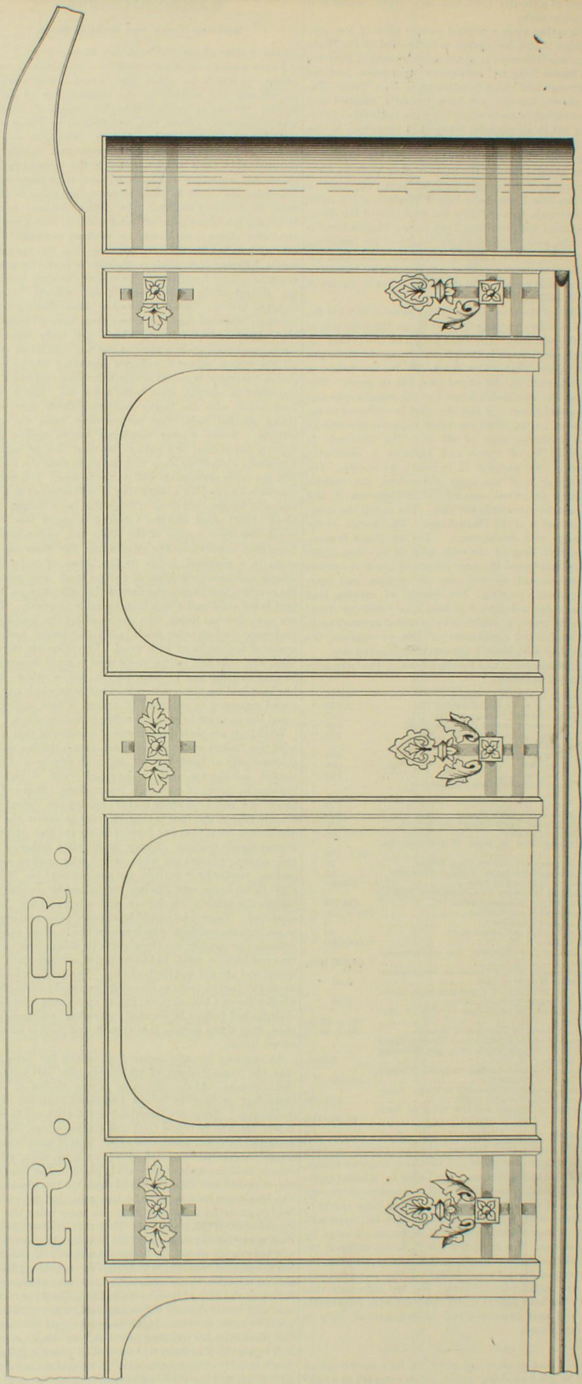
Gross earnings of all lines east of Pittsburgh and Erie	$48,566,917
Gross expenses on same lines	30,527,016
Net earnings " " "	13,875,467
Decrease in gross earnings since 1883	2,516,334
Decrease in expenses " "	1,220,134
Decrease in net earnings " "	1,654,932
Net income of main line and branches	10,185,529
Net loss on New Jersey divisions	593 536
Net earnings of Philadelphia & Erie R. R.	1,291,278
Net loss on Pennsylvania Co.'s lines west of Pittsburgh	714,681
Net loss on Pittsburgh, Cincinnati & St. Louis Ry.	114,199
Net loss on all lines west of Pittsburgh	828,880
Net loss on same lines, as compared with 1883	1,652,776
Decrease of net earnings on all lines east and west of Pittsburgh	3,320,918
	Tons.
Decrease of freight on all lines east of Pittsburgh	755,225
Decrease of freight on all lines west of Pittsburgh	1,257,839
Increase in number of passengers carried east of Pittsburgh	4,584,672
Decrease in number of passengers carried west of Pittsburgh	72,384
	Cents.
Average freight earnings per ton per mile on all lines east of Pittsburgh and Erie	0.804
Average cost of transportation per ton per mile on same lines	0.518
Average profit per ton per mile	0.286
Average earnings per passenger per mile on same lines	2.258
Average cost of transportation per passenger per mile	1,621
Average profit per passenger per mile	0.637

The number of passengers on main line increased 7 per cent., on the New Jersey divisions over 11 per cent., and on the Philadelphia & Erie over 2 per cent.

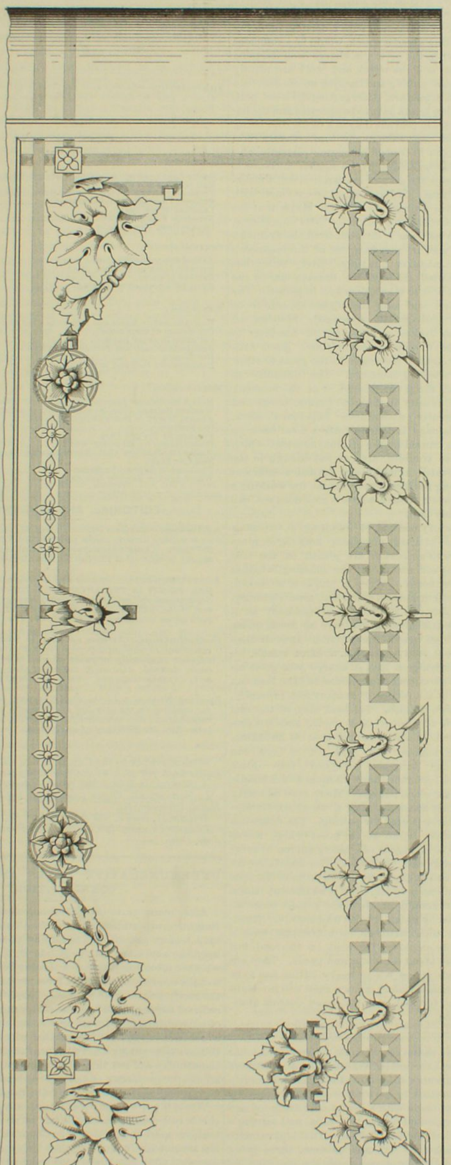
On the three divisions east of Pittsburgh and Erie 1,737,358 pieces of baggage were handled during the year, being 6,834 less than in 1883. The payments for lost and damaged baggage amounted to $1,355. The total amount of freight moved over main line and branches was 22,583,825 tons, of which 1,824,769 tons were through freight and 20,759,056 tons local. There was a general increase of 909,665 tons and a local increase of 1,022,746 tons.

There were built at Altoona during the year 81 locomotives, 88 passenger cars, 1,246 freight and 950 car-trust cars. There were used in construction and repairs on main line and branches 25,517 tons of steel rails and 787,499 ties; on the Philadelphia & Erie road 1,593 tons of steel and 25,943 ties; and on the New Jersey divisions 4,768 tons of steel and 278,605 ties.

THE Muskegon (Mich.) Car & Engine Co. made an assignment March 16. The liabilities are reported at $80,000 and assets $150,000. It is expected that the company will resume in a few months with increased capital.



"RENAISSANCE" EXTERIOR DECORATION ABOVE BELT-RAIL, FOR PASSENGER CARS.



'RENAISSANCE" EXTERIOR DECORATION BELOW BELT-RAIL, FOR PASSENGER CARS.

The illustrations represent a very handsome style o. outside decoration for passenger cars. The practice prevails quite extensively at present of running the horizontal striping uninterruptedly the whole length of the car and around the ends, in this way taking the place of panels under each window as they were formerly made.

In the designs shown in the cuts, this long striping is adhered to, but with some modifications that are very effective. The two parallel ¼-inch lines or stripes, 1¼ inches apart, form the ground of the decoration, but they are broken up at intervals with fretwork and leafage. On a car divided into five or six panels, if these stripes, are put on in gold cut up or hatched, and edged with black or umber on Tuscan red or Pullman color, the whole will present a very handsome appearance. If the color of the car is light, the edging should be in umber, or if dark, black should be used. Our next issue will contain corresponding designs for letter-board and corner decorations.

Master Car-Builders' Club.

CONDITION OF FREIGHT CARS.

The regular monthly meeting of the Club was held on Thursday evening, March 19, at 113 Liberty street, New York.

The President, Mr. Leander Garey, announced the subject for discussion to be "The Present General Condition of Freight Cars for Interchange Traffic."

Mr. J. N. Mileham, New York, Lake Erie & Western: I think, so far as the present condition of cars is concerned, it is not a very hard matter to talk upon just now. Most of our cars are in pretty bad condition. I think, however, there are several causes for it: One is neglect. When business is slack the cars are side-tracked without being examined to see what is needed in the way of repairs, and when the rush of business comes, they are put into service, and in the majority of cases they are in very bad condition. Then, I think, there are a great many cars that are suffering from poor wheels. Many of our cars are unfit for use, and in fact very few are in good condition. They have been neglected a good deal during the past year. I do not see anything to do but to go to work and put them in order. I do not think there is any money in keeping cars in bad order. We have not had any serious break-downs, but there are more or less detentions in moving freight on account of cars in bad order.

Mr. R. C. Blackall, Delaware & Hudson Canal: It seems to me that we are running very poor wheels, and it seems to me that we should meet that question. At a meeting at North Adams, of representatives of roads running from Chicago to Boston, we discussed that question, and we are of the opinion that the car-builders should publicly denounce some of the wheels that have been put under cars. The matter is getting worse. Wheels are being put under cars that are not safe. It seems to me that car-builders should notify the owners of the cars that they must discontinue putting in such wheels if they intend to run them over our lines. I do not know how you can meet it any other way.

Mr. Garey: That is a subject, gentlemen, that we have discussed more or less at various meetings, and I would like to ask where the wheels now complained of fail whether in the plate, tread, or where?

Mr. Blackall: All crack in the plate.

Mr. Garey: That seems to verify the report made by several of the lines at a meeting in Buffalo a year or a year and a half ago, that about 90 per cent. of all the wheels that were removed for breakage were on account of broken plates, showing that that was the weakest point in the wheel. Wheel-makers at that time did not think it advisable to increase the thickness of the plate. Some of them, in fact, were opposed to increasing the weight of the wheel, which in my opinion was wrong. Having increased the carrying capacity of the car by doubling it, the weight of wheel should have been increased to meet it. Then comes the time when everybody wants to get a gold dollar for fifty cents, and they crowd the wheel men down until they furnish a wheel for $6, about the price, or perhaps less than the cost of raw material, and the railroads expect to get a good article. I do not say that the companies, as a rule, make a practice of buying such wheels, but they get them on their roads from other roads that do buy them. The present general condition of freight cars in line service is probably due to two distinct causes. One is the practice of leaving them, when a slack time comes, on some side-track away from home and out of the reach of the owners, where they can not be repaired or anything done to them. When they are called for they are rushed into service in a dilapidated condition, and are kept in service as long as possible, and then they go through the same old process of shoving them out on some side-track where they can not be conveniently reached. The other cause is the want of sufficient funds by the railroads to employ men and buy material to put the cars in proper condition. I know from experience that the condition of such cars has been gradually getting worse ever since the lines went into operation, and it has appeared to me for the last two or three years that unless some action was taken to put the cars in the shops of the owners, or in shops where they would be repaired properly during slack times, that the time would come when there would not be a sufficient number of serviceable cars to do the business. I am not aware that this time has yet arrived, but it is very near here. I should not be surprised if many of the roads could say to-day that they have disabled a very large number of cars during the past sixty days. The percentage of disabled cars in service never was so great as now, and there is good cause for it.

Mr. C. A. Smith: Is the present condition of railroad cars due mostly to the wheels, or is it to other parts of the structure? Are there not more cars in a disabled condition from defects of the body, draw-gear, etc., than from wheels? I think one cause why we find so many cars in such bad condition is the fact that the inspectors pass them when they should be rejected. If a car is unfitted for service it should be turned back to the owners. Refusing to take cars in poor condition will gradually bring about improvement. Regular line cars owned by railroads get home most of the time. I think if there was a more rigid inspection there would be less trouble with cars running in line service. It has been a question in my mind whether some of the rules regulating the repairs of cars have had sufficient consideration before they are passed; whether there should not be a little more time given when these rules are revised. Take for example the way it is done at our annual meetings. One rule after another will be brought before the meeting and adopted. One may say, "I don't like that, it is not right, but I won't say anything; I'll let it pass." Are there not many things that could be added to these rules to make them more specific? Every little while you will hear somebody grumbling that this or that rule is not right, and, as a man said to me a short time ago, "What do you go to the annual meeting for but to make these rules as they should be?" I think the great trouble is that the roads take cars that should not be taken. I know a case only a short time ago where cars were found fault with. The man said the inspector took them and did not reject them, and why should they not go through? We all know what the majority of the inspectors are. They are not all fully expert men They will pass cars, and if the cars can go through once to their destination, then they need repairing.

Mr. Blackall: How would you send a car back?

Mr. Smith: Suppose a man should send a car over to you, going to Boston, and it is not in good condition. You have a good chance then to turn it back to the owner.

Mr. Mileham: I see that Mr. Smith speaks about the inspectors doing so and so. Now I find that inspectors will do exactly as they are ordered to do. But the trouble is just here. Take it when business is slack, as it has been, and some of the big lines will have from 3,000 to 5,000 condemned cars side-tracked. They do not use them, and there they stand; no attention is paid to them; but by and by comes a rush of business, the cars are called for, and if they are not ready for active service you will be pretty sure to hear from the superintendent right off. I say it is not the inspectors, it is something back of them. It is the companies. They want to do the business, but the cars stand there neglected. As Mr. Garey says, it is only a question of time. These cars will get blocked, and if a rush of business comes, none of the roads will have the cars they ought to have. There are lots of cars running to-day that ought not to run.

Mr. Smith: Undoubtedly that is the case. But who should be responsible for them? The railroad companies find fault if heavy repairs are made on some of the cars that are not fit to run. Should the companies find fault if a bill for repairs is sent in to them? If one of these cars gets in an accident, you will hear of it. If your cars get on some other road in a bad condition, and large bills are sent in for repairs, you should not say anything. Somebody back is responsible, as Mr. Mileham says, but even without that, the inspectors should be more rigid in the examination of cars when they pass them from one road to another. Then, if they are not in good condition, the cars should be turned back to their owners.

Mr. W. E. Partridge: During a trip West some months ago, I had a talk with a gentleman connected with a through line, and he expressed some views that struck me as rather curious, and they seem to come in very apropos just here. He was talking about putting a large number of cars into a through line, and the question had been discussed as to how they should be built, what specifications should be used and how much they should cost. He finally came to the conclusion that it was best to get the very cheapest cars he could, regardless of quality. Then of course when the $5.50 wheel gave out anywhere off his line, he would get a little better wheel than he paid for, and so with everything else. If a board came off the roof of one of his cars and somebody put another one on, it was a dead sure thing that the knots in it would be considerably smaller than in the one taken out, and he came to the conclusion that there was no money for their road in putting first-class cars on their line trains.

Mr. Blackall: My opinion is that the inspection of cars is getting to be too fine. Now, if a car comes to us with a little defect, they will not take it until we put a card on, and pretty soon back comes a bill just because we put that card on. I think the inspection is too fine. I think with Mr. Smith, however, that we ought not to find fault with close inspection.

Mr. Garey: I am quite positive that if the rules were strictly applied with us not ten per cent. of the cars in the interchange traffic would be allowed to pass inspecting stations or interchange points. Now, the idea of turning those cars back on the owner is a good one, if the thing can be done. But when the interchange traffic was inaugurated, some 18 or 19 years ago, the cars then were in very much better condition than they are now, and they found very much difficulty in getting them from one road to another. Since that time we have gradually become familiarized with the necessity for moving freight to destination, and, if possible, to do so without transfer. Now, there are roads which have put cars in that traffic and have never seen them from the time they were put in until they were worn out; in fact, some roads, I have learned, have placed cars in interchange traffic which they had not seen for ten or eleven years, or until they were sent home in a condition unfit for further service. These cars were troubled with general debility. Now, if freight is to be moved in a car that can be passed to destination with safety, it ought to be done, and the car got home as soon as possible after the freight has been delivered. If this could be done, it would be a good thing, but the railroad companies can not be made to see the necessity of getting cars home and putting them in a condition that will warrant their running safely and at the least possible expense. I do not know that the time will ever come when the roads will see the necessity of doing this. It will probably not be until they have an immense traffic and a large stock of cars they can not use. Some of the Eastern roads have fought hard for a closer inspection, and I think they are right in so doing if it could be kept up the whole length of the trunk lines and the roads made to put their cars in a better condition than at the present time. I hope the time will come when the railroad companies will see the necessity of paying a dividend or two in repairs for their rolling stock.

The subject for discussion at the April meeting will be Cast-Iron Chilled Wheels. Railroads are requested to send to the meeting samples of wheels that have failed by breakage.

Adjourned.

The Baden state railways have adopted the Westinghouse air brakes.

The Chicago & Northwestern has given an order for 250 flat cars. The contract is said to have been given to he Peninsular Car Works of Detroit.

Power Hoists for Handling Wrecks.

A large proportion of those who have had charge of railway wrecks hold the opinion that a crane or derrick, with a long rope extending to a locomotive, forms the best possible hoisting apparatus. The prevalence of this opinion is probably the reason why most of the derrick cars built by the roads are arranged so that when power is needed it is obtained by attaching the "fall" to a locomotive.

If it was necessary to convince a man that a locomotive engine is not suitable for the purpose, it would seem that the engine at work in connection with a derrick, or doing miscellaneous hoisting about a wreck, would be a sufficient argument. Even when the person in charge is on the same side as the engineer, and the wreck and work are plainly seen, starting the load, pulling and backing up are done in a dilatory and uncertain manner. After getting the word, both throttle and reversing levers have to be operated and the engine started with care to prevent the slack of the rope being taken up with a jerk due to the momentum. Even a careful man may be unable to control his engine perfectly, and a rope or chain may be broken by its sudden movement. The heavier the engine the greater the care and deliberation needed in its handling. Orders cannot be executed with great rapidity unless things are in such shape that the complete destruction of the wreck is of little importance. When the work to be done is directed from the fireman's side, or when the man in charge is out of the engineer's sight, delays and mistakes multiply. Every order has then to be transmitted through the fireman, unless the engineer leaves his post to take the orders in person. The time needed to start and stop the engine appears to be doubled, and is certainly greatly prolonged. Shutting off steam and applying brakes, or using the reverse lever to aid in stopping the motion, consumes time. Even with good brakes, the weight of the engine is too great to allow its motion to be checked instantly. The difficulty in stopping exactly at the point desired, or at the moment the order is given, results in broken chains, hooks and ropes, and frequently disarranges important work. Frequently more damage is done in getting a car back on the track than was caused by the original accident which threw it off. These troubles, always bad enough in the daytime, are aggravated at night, and furnish a sufficient reason for discarding the locomotive engine for working a derrick, or in any work about a wreck which does not call for a long and steady pull.

The most satisfactory method of handling a wrecking derrick is by the use of a pair of regular hoisting engines and a drum. Engines and drum are placed on the rear end of the wrecking car, and do all the hoisting whether fast or slow, light or heavy. When a pull is to be taken, a motion of the hand or lantern starts the rope instantly. At a given signal, the rope stops quite as suddenly as it started. The ropes and hoisting gear are as much under control as though men were at the winches. In most cases the hoisting engine is even better than a hand winch, because there is one intelligent men in charge who gives his whole attention to executing the commands. The load can be lifted one, two, or ten inches, or as many feet, promptly, and almost to a hair's breadth. The load may be the end of a car, a stick of timber or a truck, and not produce any variation in the apparent ease of working. With a hoisting engine, the end of a car can be lifted and the king-bolt dropped into place with more ease and certainty than two men would handle a wagon body for the same purpose. There is no necessity for any of the minor accidents after a wreck which happen when a locomotive is used for pulling. The drum can be held by its friction brake at the point where it was stopped, and there is no inertia of a heavy engine to overcome before the stop can be made. The rapidity with which everything can be done very much reduces the time required for clearing up a wreck. This is a sufficient reason why power derricks should in all cases replace those intended to be worked by hand, or with a locomotive. Hoisting engines when thus fitted up in connection with a derrick, are not only employed for work on the road, but for a variety of uses about the shops and yards. They are useful in almost all places where heavy lifting has to be done. As their value becomes known they will no doubt be more generally adopted, and the hand derrick abandoned or remodeled.

An exchange says that a new electric railway brake has been tried on the Cincinnati, Washington & Baltimore division of the Baltimore & Ohio road, with such astonishing results that no stock in the brake company is now for sale. The trial was made with a heavy coal train of ten cars, each weighing, empty, about 11 tons, and having a tonnage capacity of 40,000 pounds The brakes were applied only to the freight cars and caboose, there being none on the locomotive or superintendent's car, and no hand brakes were used. The loaded train, with full steam on, was put to a speed of forty-eight miles per hour on a down grade of 68 feet to the mile, and brought to a dead stop in 37½ seconds after putting on the brake, the distance run in that time being 445 yards, exact measurement. The brake acts automatically in case the train should part, signals both cab and caboose, and applies the brake to the rear portion, still leaving the engineer with complete control of the forward part.

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EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* The National Car-Builder. *Communications for the attention of the Editor should be addressed* Editor National Car-Builder.

Advertisements.—*Nothing will be inserted in this journal for pay,* except in the advertising columns. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock, construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notices of changes in railroad officers, organizations and names of companies.*

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UNREMUNERATIVE RATES AND EXCESSIVE CONSTRUCTION.

After many years of continuous decline, the rates of freight transportation have reached a point beyond which they cannot go without becoming unremunerative even upon the best managed roads. It is, indeed, a question whether some reaction is not absolutely necessary to protect the interests of railways from serious injury. When the receipts from traffic are only barely sufficient to cover reduced expenses and interest, there must be a cessation of expenditure for current repairs and renewals in order to avoid bankruptcy. It is clear that when such a state of things exists among the railways, the general business of the country can not thrive as it ought to, for whatever affects the prosperity of railways is bound to affect in a corresponding degree the general prosperity.

What, then, is to be done, or can any thing be done, to check rate-cutting competition so as to make railway business more remunerative? The local State authorities are not likely to "regulate" charges in an upward direction after they have been so long engaged in raiding them down. It is quite natural to suppose that the primary cause of reduced earnings is the excessive multiplication of new lines, and especially parallel lines, the result of which is to divide the business among a greater number of roads, when a lesser number could do it just as well. It is also a popular impression that the more roads there are the greater the competition, and that a corresponding benefit results to the community in the way of cheap rates. But it is a question whether the community really does derive any benefit, in the long or short run, from the absorption of capital in unprofitable roads. Such investments are nearly equivalent to a total loss. It may be said, however, that an unprofitable road is not necessarily a superfluous one. Its business may grow, and at some time yield a profit. Parallel roads, so-called, are not considered paying enterprises nor examples to be imitated. A good deal depends upon how far such a road is from the road that is paralleled. The two may be so close together all the way between their respective termini as to be able to serve only the wants of the same contiguous territory, or they may be so far apart as to be competitors only for through traffic, the local business of the two being quite distinct. The parallel line would in such case encourage a local business of its own which would otherwise have been imperfectly developed, or not developed at all. It is rarely that the capacity of any road is fully utilized. There is always a margin, especially in this country, for growth of traffic, and a road well constructed and equipped can always adapt itself to such growth by a small outlay as compared with its original cost.

The dreaded bugbear of consolidation having resulted in a reduction instead of an increase in rates, and government ownership being out of the question, it has been seriously suggested that the only way to put a stop to excessive construction is by legal limitation of some sort, or, in other words, by repealing general railway laws and granting no charters for new lines unless the projectors of them can show to the satisfaction of a legislative committee or a railway commission, that such lines are sure to be profitable and of public utility. This plan might work well enough in sections of country where construction has manifestly been overdone. But is it right to assume that the members of a committee or of a commission are better judges of the utility of a proposed road than are the projectors who are willing to risk their money in it? If it could be shown to be a speculative scheme merely, designed to float worthless securities and entrap the unwary, it would be well to have it frustrated at the start.

It is clear that legal limitation or absolute government control, as a check upon excessive railway construction, is inadequate to meet the case without hatching numerous other evils now mainly conjectural, but which might turn out to be very real. Like other manias, the folly must be permitted to exhaust and punish itself as it is now doing. The evils of competition will have to be endured until capital becomes more conservative, by distinguishing between air-blown bubbles and enterprises that have a substantial basis and give promise of sure returns.

THE CAR-HEATER OF THE FUTURE.

A railway superintendent whose long and successful service entitles his opinions to great weight gives the following outline of what he considers the best method of heating passenger cars.

He says there is but one way in which safety and perfect comfort for the passenger can be combined. To the systems now in use there are many objections, the most of which are inherent and cannot be obviated. The method of hanging stoves underneath the car has several advantages. The danger from fire is very slight and may be considered as practically removed. Placing the stove outside does away with much dirt and annoyance in the car and at the same time increases the seating capacity. A serious objection, however, is found in the winter, when its heating power is not equal to the demand upon it. When running during heavy snows, the stove is cooled off and the cars are not heated as they should be. On a snow-bound train the exposure of the stoves on the outside of the cars is a very serious matter? Fuel cannot be readily carried to them and they cannot furnish heat when snowed up. This drawback is inseparable from all systems where the heating apparatus is carried below the car. In case a brake-beam gets down, all the light under-work of a train may be torn away, including the stoves. This would cause much inconvenience on a through train in very cold weather. To the ordinary forms of steam heating apparatus inside the cars, there are also many objections. The most important of these are the dangers of explosion and fire. These are real and serious. The heaters take up considerable room and require much attention from porters or trainmen. If they are neglected at the terminal stations they are liable to become more or less offensive. In extreme cold weather they are usually not powerful enough to permit effective ventilation.

In mentioning these defects, the superintendent referred to does not wish to be understood as finding fault. He is at present using a hot-air system which is doing good work and is much liked. He considers it both cheap and effective, and finds that it gives satisfaction to the patrons of the road. Still it has the characteristic defects of the system and these cannot be remedied. Steam heating or its equivalent is desirable, but the steam cannot be taken from the engine, as many suppose. In cold weather the locomotive has already quite as much as it can do to supply steam for its own work. There is no surplus to spare, and the proper heating of a train calls for a large quantity of steam.

The plan proposed is both expensive to build and costly to maintain, but the desired results can not be obtained with a small expenditure of money. These objects are the safe and perfect heating of a train in all kinds of weather and under all the varying conditions of railway service. In addition to this, a sufficient surplus of heat must be provided to enable the cars to be perfectly ventilated in the coldest weather. To carry out these plans, a strong car like those used for baggage or express work would have to be constructed for the purpose. In this car would be placed a large boiler, say of the locomotive type, the size of which would be determined by the quantity of heat needed to warm the largest train in the coldest weather. A tank for water, coal bunkers, a room for stores and tools, and another for the man in charge would have to be provided. The boiler-room should be sheathed up with stout iron, and perhaps a double lining with a non-conducting filling between might be desirable. In case of a smash-up or a run-off this would prevent fire. An iron house might be more economical as well as stronger than wood. Steam heating, the steam being supplied from a boiler in a separate car might possibly call for too large a consumption of water. The circulation to some extent would be interrupted by the traps between the cars formed by the couplings, which would necessitate a continuous blow-through system. A hot-water circulation would avoid these evils and could easily be made positive by means of a pump. This would enable the piping to be arranged in the most convenient manner, regardless of traps.

The cars would be connected by double hose couplings which would be protected by non-conducting coverings carefully wound and wired. A somewhat peculiar circulation would be needed. The pipes should be so fitted that, at will, the water could be sent the whole length of the train and returned to the boiler without necessarily passing through the heating coils of any of the cars. Every car would in this way be made independent of the general circulation. Double doors would be essential on all the cars, or what is equivalent to vestibules. These might be arranged as in Pullman cars, and although they would diminish the seating capacity of day coaches, they would lessen the difficulty of heating in cold weather

The heating of a whole train by this system would be in the charge of a single man who would have no other work to do. It might be expected that with the heating and ventilation as his sole business he would be able to attend to the wants of the passengers in a more intelligent manner than an ordinary trainman.

A train thus fitted might be delayed in a snow bank a long time without the usual inconvenience of cold cars. An ample supply of coal would be provided in the bunkers of the heating car, and water could always be obtained by shoveling snow into the tank and melting it. In case of a run-off or a smash-up, there would be little danger from fire. The fire in the boiler of the heating car would be well protected, and there would be only a remote probability of its setting the wreck on fire. The car itself being lined throughout with iron, would not be easily burned, and it may be assumed that the danger would not be greater than it is from the locomotive. With sufficient heat at command, there is no reason why the ventilation of the cars should not be made very nearly perfect. All the air entering could easily be warmed to a comfortable temperature before being distributed through the car.

The superintendent said furthermore that the maintenence of an apparatus of this kind would be expensive in the extreme. It must not only be large and complete, but it must also be in duplicate. Broken wheels, defective running gear, and all the incidental repairs which throw other cars out of service, cannot be allowed to deprive a train of its heating car. This car must be as certain in its work as the locomotive itself. Such a system is not likely to be adopted at once, but it has features which must come into use at some future time. It has been carefully considered in all its details, and some enterprising road may possibly be induced to give it a trial as an advertisement to attract travel and distance rivals.

HOT BOXES.

Ten or a dozen years ago there was a great deal of complaint about the heating of car journals on the roads generally. Very few railway men, it is true, complained of any such trouble on their own roads, but there was no end of it with the cars belonging to other roads when away from the home lines. Within a few years past, however, the trouble, even with respect to foreign cars, has very much diminished, or else it has come to be regarded so much as a matter of course, that a great deal less is said about it. We are inclined to think there is really much less cause for complaint, yet we hear it said from time to time by disinterested observers, that hot-boxes are numerous on east-bound freight trains in the vicinity of Chicago, and that it is no unusual thing to see several of them in a single train not fifty miles away from that city.

It is very true that the most careful inspection, packing and oiling can not always prevent heating, but if the reports referred to are to be credited, it must be owing to some inexcusable neglect. The effective system of inspection which is kept up by the Lake Shore road for trains coming east, makes it difficult to understand how cars on that line, at least, can get out of the yards without receiving the requisite attention. At the points where trains are made up, there are three sets of men who are respectively charged with the duties of inspection, repairing and oiling. The inspectors have nothing to do with the repairing, and consequently have no inducement to pass over defects. After the inspection, the repair gang make the repairs that have been marked, then the oilers pack and oil the boxes, and the train is ready to proceed. The oilers cannot slight their work without being detected, for the reason that any delays in the progress of the train are reported, together with the causes.

Assuming that there is no lack of attention in these respects, the only conclusion is that if there is heating of journals it is owing to some defect in the construction of the cars, it may be journals of insufficient size or badly fitted. It is well known that the M. C. B. axles and journals, although in general use, are not of uniform dimensions, but that the variations from the standard are quite frequent, and are to be found upon roads that profess a nominal adherence to it. The axles are not only made smaller in their centers, but the journals also are reduced from the standard size. With the constantly increasing weight of loads, any lessening of the size of journals increases the risks of heating by diminishing the bearing surfaces. In addition to this, badly fitted brasses, trucks out of square, and poor material in axles, combined with overloading, all tend to increase the probability of hot bearings. In the great majority of instances, the owners of cars are justly chargeable with the heating.

CAR SHOP DRAWING-ROOMS.

Until a comparatively recent period it was unusual to find a drawing department in connection with a car shop. Drawings were not formerly considered essential in actual car-building. A dozen years ago more than one of the great contract shops had no regular draughtsmen and made no drawings for their ordinary work. Then it was exceptional to find a foreman of a wood-working shop who could read an ordinary working drawing. There were many car-builders even, to whom such drawings were not entirely intelligible. Now the conditions are entirely changed, working drawings are not only generally understood, but their value is appreciated and comparatively little work is undertaken without previous elaborations of some kind on paper. The change has not been confined to wood-working establishments alone. In all manufactories working drawings are considered indispensable, and they are more extensively used than ever before. The introduction of the "blue process," by which copies may be obtained at a nominal cost and with little labor, has widened the draughtsman's field immensely. In many establishments a drawing room was formerly impossible on account of the cost of making tracings and the time occupied in producing them. Now, however, they can employ draughtsman, since the copies can be cheaply and quickly produced, an unskilled boy, with a tracing, doing in a single day more work than a small army of draughtsmen could have performed in the same length of time,

In spite of the well recognized advantages of drawings, there are still comparatively few car-builders in the country who have proper facilities for doing this branch of their work. In some shops there is a drawing-room with boards, tools, and a handsome array of lockers, but no draughtsman. The car-builder has to work out his drawings at odd moments as best he can, and make the required blue prints. Fortunately, the advantages and importance of drawings are becoming better known and appreciated by railroad men, and car builders have less trouble in getting their superior officers to allow the necessary force in this department. The car-builders are themselves to some extent at fault in this matter. They are not as thoroughly convinced of the need of drawings as they should be. Even at the present day, too many of them are willing to undertake the construction of a lot of cars from moulds, graduated sticks and templets. They design and build from day to day, altering when necessary what has gone before, and getting at the final result by the "cut-and-try" method. To such men the drawing is too often only an elegant picture to be kept clean. Like a photograph, they regard it as a representation of the finished work. Men of this class are passing away and are being replaced by others who are more liberal in their ideas, who have learned that there are better methods and are adopting them. When a man dies who has always kept his designs on boards, battens, poles and templets, the cost to the company can hardly be estimated. Without the originator to use them, the devices for laying out work become inexplicable, and the loss to the road is equivalent to the destruction of all its working drawings.

Little need be said at the present day of the value and advantages of a well organized drawing-room. These are almost universally conceded. The present dullness in business appears to offer to the car-builder an unusual opportunity for the arrangement of such a room, the preparation of the needful apparatus and obtaining or instructing the daughtsman.

To fit up a drawing-room is neither a difficult nor a costly work, and in many cases can be done with a merely nominal expense. The lockers or drawers for the drawings are the most important and expensive. After a drawing-table and boards have been provided, the next thing is the dark room for preparing the blue paper and washing the prints. This room, as its name implies, should be literally dark. There should be no light admitted from the outside, nor should any be visible when the door is closed. In such a room, blue paper after being sensitized, may be kept in drawers for an indefinite time. The fittings of the room are most simple. There should be a table of the size of the largest sheet of paper that is to be used for making prints. This table should be covered with a sheet of zinc or galvanized iron, which should be tacked down all around the edge. It is best put on by turning it down around the edges so as to leave the surface flush. If cramped for space, this sensitizing table may be omitted and the zinc tacked against the wall. The roll of paper is then hung over it and the sensitizing is done in a vertical position. The metal does not absorb the coloring matter, and that which adheres may be easily removed. This prevents any staining of the paper. Under the table, if space be lacking, may be placed the trough for washing the prints. This may be of wood, but should always be lined with metal. Galvanized iron is a very good material. If there is no regular water supply, a barrel in the corner on a stand three or four feet from the ground will answer the same purpose. A pipe with a faucet should connect it with the trough. If a second trough can be afforded, it can be used for the final soaking in clean water. This will greatly reduce the quantity of water used and improve the quality of the prints. All things considered, the best light is that furnished by a lamp or gas. To use windows, introduces the question of colored glass or paper, and the light thus obtained is likely to be more trying to the eyes than that of a lamp. Further accessories of the room may be left until they are actually needed.

In beginning, it is well to remember that small sheets for drawings are the most convenient, as well as cheapest. The sizes of drawing-boards, troughs for washing prints, T-squares, drawers and the whole apparatus is reduced in proportion. By the use of different scales a car may be as well represented on a sheet 18×22, or 24×36 inches, as on larger sizes. A car elevation drawn to a scale of $\frac{1}{4}$ of an inch to the foot, gives a better idea of the proportions and external appearance of the car itself, than if drawn to a scale five or six times as large. With careful drawing, and no other should be tolerated, details may be worked out on sheets of this size, as well as on those of mammoth dimensions. One of the leading engineers of the country has all his drawings made on paper of 28×36 inches. He finds no difficulty in getting elevations of the largest and most complicated machinery on this size of paper.

By improving opportunities, drawing-boards can be provided and printing frames made. The boards can be purchased much more cheaply than they can be made, unless the sizes are very large. The printing frames can be made in the shop better and for less money than those that are for sale. Should any of our readers wish for information on this point we shall be glad to give it. The drawing tools need not have very much thought in advance. They should be purchased as they are wanted. To buy a box of them is a great waste of money. Many things which are never wanted are always thrown in, while many essentials are omitted. The box itself costs extravagantly and is not particularly useful. A velvet or flannel-lined tray, made in the shop and not costing more than 25 cents, is much more convenient.

Lastly, we consider how the draughtsman is to be had in these hard times. In most shops that question is supposed to be a serious one on account of the large expenditure of money involved. The solution of the difficulty is easy. Good and cheap cars are built to order, and the car-builder must build his draughtsman, so to speak, according to his own specification. In other words, get a boy who has some idea of mechanics and set him at work. A few books on the subject of handling draughting tools, and a few of the most essential instruments, are sufficient for a beginning. The first lessons may be copying car-drawings from the Car-Builder. These will teach him how different parts are represented, and show where shade lines, dimensions, etc., should be placed. The next step is for him to make a drawing from actual measurements of an object. This lesson might be some simple part, like a brass. As progress is made, more complex things may be taken as subjects. The stock of instruments should be increased as the need for them is felt. The quantity of work which boys can do with proper encouragement and self-instruction is hardly to be credited, and the quality is surprisingly good. The experience of many car-builders proves that fair and even good draughtsmen may be obtained from easily accessible material without much effort.

REFRIGERATOR CARS AND PERISHABLE FREIGHTS.

Railway tonnage has reached its present magnitude in this country by a rapidity of development little dreamed of in the first stages of its growth. It has kept on increasing with scarcely any check during prolonged periods of general business depression, sustained as it is by the ever-increasing products of a vast territory, and the industrial activities of a population increasing at the rate of a million and a half a year. The carrying capacity of the roads has grown with the demands made upon it, until there would seem to be no assignable limit to either. Articles are transported every year of a kind that were never transported before, and if the cars already in use are not adapted to the new traffic, special cars are soon devised and built that are suitable for the purpose.

An illustration of this is afforded in the remarkable growth of the transportation of perishable commodities within the last few years by means of refrigerator cars. Every year adds to the volume of this traffic, and although the business is attended with some drawbacks in the way of losses from delays in transit, it is bound to keep on increasing to an indefinite extent. The shipment of dressed meats from Chicago and other points further west to the Eastern seaboard, has already grown from small beginnings to a heavy traffic, while the semi-tropical fruit products of Cuba, Florida, Mexico and Southern California are finding their way to Northern markets during the warm season in larger quantities every year in refrigerator cars so well adapted to the purpose as to make the losses from the perishable nature of the freight comparatively light. The extent to which this branch of traffic will be developed in future is at present a matter of conjecture, but it is likely to be large.

In regard to dressed meats, every thing depends upon its condition and price at points of destination as compared with shipments on the hoof. The abuses practiced in live stock transportation from the Far West under the spur of competition, are necessarily attended with serious shrinkage in weight, to say nothing of the alleged deterioration in the quality of the meat, especially beeves, upon reaching the Eastern stock-yards. Only a few years ago the dressed beef business between Chicago and New York was in need of friends to sustain it against the stock yard interests, but since then it has been steadily gaining ground, and it is now said the number of cattle slaughtered last year in Chicago by the principal dressed beef shippers, was 694,026, which was an increase of twenty per cent. over that of the previous year. To this must be added 128,000 sheep shipped in carcase. The number of dressed hogs is not stated.

This would seem to support the claims of the shippers that dressed meats, and especially beef, are received at destination in much better condition for consumption than when shipped alive. It is also stated that the cold storage business is increasing at a corresponding rate, buildings for this purpose having been erected in upward of one hundred Eastern towns, exclusive of the chief cities, for receiving these shipments.

THE PENNSYLVANIA RAILROAD REPORT.

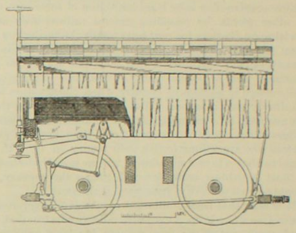
The abstract we give elsewhere of this report shows a considerable decrease in earnings during 1884. In view of the industrial stagnation, this was to be expected; but, as appears from the report, the decrease is due to the reduced freight rates, and not to any material falling off in the volume of traffic on the lines of the entire system east and west of Pittsburgh. Taken as a whole, the traffic has been well maintained, there having been an actual gain in freight on the eastern lines and a comparatively small loss on the western. The falling off in passengers west of Pittsburgh has been considerably more than made up by the gain on the eastern divisions. The net earnings, however, do not show so favorably, the total falling off, as compared with 1883, amounting to some $3,000,000, and due almost entirely to reduced freight rates rendered necessary by competition of other lines for through traffic. The development of local traffic on the eastern divisions has constantly increased, and this, with the cutting down of expenses to the lowest limit, has kept the reduction in earnings from reaching a much larger figure. With respect to the passenger business, it is to be noted that the increase in the number of passengers carried was the largest on the New Jersey divisions, and next largest on the main line, and that the net profit per passenger mile is but a small fraction less than in previous years. The present report gives only general results. A more full and detailed one, covering the operations for the year, is expected to be made in due time.

Considering the severity of the past winter, it is worthy of note that no first-class railway accidents have occurred. There have been a good many of the minor sort, it is true, some of which were attended with loss of life, but there have been no startling holocausts such as have given the names of New Hamburg, Ashtabula and Spuyten Duyvil a lasting but unenviable repute in railway annals. This growing margin of safety is highly creditable to railway management, and especially so to those who have to do with the running of trains and working of signals. It is an indication of better discipline and service, better tracks, bridges and running gear, and the use of more effective mechanical safeguards. In the meantime, the increase of traffic and new road mileage has greatly increased the number of trains of every class, especially suburban passenger trains, so that the total movement relatively to the accidents which occur is vastly greater than it was a few years ago.

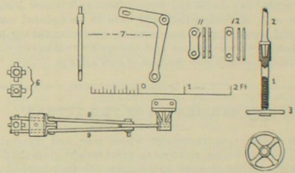
If the simultaneous movement of all the trains on all the lines in the great northern railway belt, could be shown in a bird's-eye panoramic view, the marvel would be that there are not a hundred accidents where there is one. Instead of raising a hue-and-cry about "slaughter" and "murder," as is now the fashion when an accident happens, the public should realize to a greater extent than it does, that the general immunity from such occurrences on our railways is quite remarkable, and that it is due to increased efficiency in their management, the multiplication of safeguards, and the greater perfection of mechanical devices for resisting the wear and strain incident to the increasing weight of engines, cars and train loads.

The Laufman Screw Car Brake.

The cuts show the form and operation of this brake, a brief description of which appeared in our March number. The brake is applied by a screw operated by the wheel and shaft in the usual way. The shaft is threaded at its lower end and is attached by a threaded wrist to the short arm of a bell-cranked lever, the action of the lever as it is raised or lowered by the revolving threads, applying or releasing the brake. The friction of the screw threads is sufficient to hold the brake without using a dog or ratchet and in this consists its chief advantage over a chain brake.



General View.



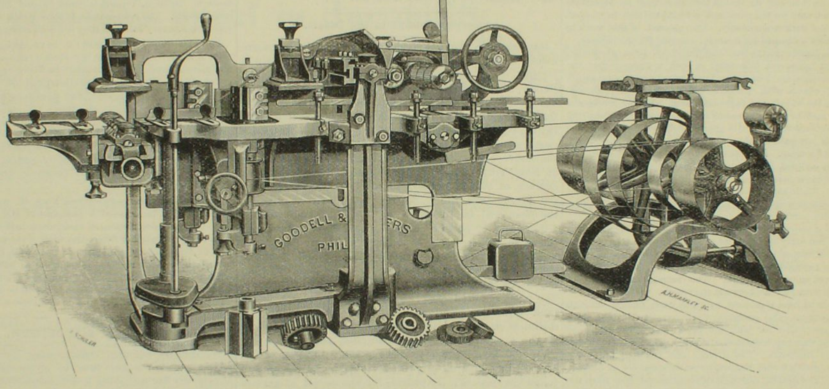
Details.

The shaft, as will be seen, has a wheel at its upper and lower end, which enables the brake to be applied or released from the top of the car or from the ground.

The Framing of Freight Cars.

In designing the framing of a freight car, it must be remembered that bulk cargoes like grain bring strains to bear upon the sides which are practically hydrostatic in character. Many other kinds of merchandise are loaded in such a manner as to cause severe thrusts on the car walls. In stopping and starting, the surging of loads tends to burst out car ends. To resist these strains, the side of the car ought to be strong and both posts and rails must be stiff. When a sufficient quantity of timber has been provided for this purpose, there is ample material from which to form a truss to carry the heaviest load which it is safe to place upon the wheels and axles. To design a car truss which shall be light and strong, and at the same time not waste timber, it becomes necessary to begin at what may be considered the end or conclusion of the problem in order to find the suitable sizes. The order of the work will be as follows: We lay out a frame with a post over the bolster, a counter-brace to the end of the car, and another brace to the plate at the door-opening. It is not necessary to go through the ordinary computation, using the load as a basis to ascertain the sizes. On the contrary, the load is neglected altogether. We first consider what dimensions shall be given these members, to obtain, with the aid of suitable rails, a side of sufficient stiffness to withstand the outward thrust of the load. Next we find what dimensions the pockets for the posts and braces must have, in order that they may exert their full strength without indenting the plates and sills. The strength of the brace determines the size of the plate which has to transmit its thrust across the door-opening. The thrust which the brace is capable of exerting, also fixes the size of the washer to be placed on both ends of rod at the door posts. The rod, at its limit of elasticity, must be just able to cripple the brace. From the thrust which the brace brings to bear, it appears that the plate can be advantageously reinforced by a distance-piece placed between the door posts over the door. This adds materially to the stiffness of the top chord of the truss. When tested, a well proportioned car side shows its first weakness in the buckling of the plate. These members complete the truss unless a second brace starting from the bolster is added. This brace is set at an angle smaller than the other, and reaches the plate half way between the bolster and the door. The size of a brace in a 34-foot car, 24 feet spread, will not be very different from those used on some of the leading roads which use this form of construction. With this as a basis, it will be found that a 5 × 8 inch sill forms a fair bottom chord, and that the truss will have an approximation to equal strength in all its parts. With 1⅝ inch rods at the doors-posts, the truss would be on the point of destruction when loaded with 70,000 pounds, or 140,000 pounds for the whole car. Subtract from this, say 20,000 pounds for the outside weight of the body, and there remains 120,000 as the breaking load of the two trusses. The strength of a car-body of this kind to resist racking strains in buffing, is so great as to make it idle to discuss them. As a means for adding strength to the body, the usual truss-rod appears absurd. Its value is greatly diminished by the practice of putting in a pair of queen-posts, or truss-rod bearings, under the needle-beams, instead of a king-post.

The figures given are amply sufficient to demonstrate the proposition, that where a car-wall has sufficient strength for its local work as a wall, there is ample material from which to form a truss which will support any load that can be safely carried by the trucks.



NEW NINE-INCH FOUR-SIDED MOULDING MACHINE.

The engraving represents a newly designed Nine-inch Four-sided Moulder recently produced by Goodell & Waters, manufacturers of wood working machinery, Philadelphia, Pa.

This machine, while combining all the good qualities of a first-class moulder, embodies several new and important features. It is specially adapted to car and railway work. The frame is extra heavy and strong, and arranged to support the top head and table. The base is carried out beneath the frame to form bearing for the screws to raise and lower the table. The screws, which are made of the best machinery steel, are placed diagonally in relation to each other directly under the upper and lower heads, and conveniently operated by a crank near the under head.

This machine is capable of planing 9 × 5 inches, the table drops 14 inches, the top and under heads carry 9-inch and the side heads 5-inch cutters. The mode of adjusting the cutter heads is simple, accurate and convenient.

The outside bearing for the top head is supported by a heavy upright column resting directly on the base of the machine, affording a very solid outside support for the mandrel essential for smooth and accurate work. This is a very important improvement in moulders of this class. Both side heads are supported on the table, and are provided with transverse and swivel adjustment; the bottom head is provided with transverse and vertical adjustment.

The feed works are very strong and steady, consisting of three rollers of large diameter, two above and one in the platen, all driven by a train of powerful gearing. The changes of feed (being 25, 32, and 40 feet per minute) are effected by gearing and controlled by large hand wheel near to position of operator.

The upper rolls are arranged so as to always raise parallel with the stuff being worked, the pressure-bar is very conveniently arranged and self-acting, and being connected with the bonnet or shaving shield, may be swung instantly out of the way to secure ready access to the cutters. The countershaft with driving pulleys is placed on the floor separate from the machine, and has a tightening device which proves very effective in starting a new machine and bringing belts to proper tension, avoiding relacing. The yoke of the countershaft has a table attached convenient for holding tools, etc., for use of operator. The fast and loose pulleys are 14 inches diameter, 7 inches face, and should make 900 revolutions per minute.

Prices and further details may be obtained by application to the manufacturers, as above.

The London Express Engineer.

No two engines ever resemble each other, no matter how carefully they may have been built from the same plan, neither do any two drivers manage their engines precisely in the same way. We have in this instance an excellent opportunity of comparing two different methods of driving. It is the driver's principal object to get the required amount of work out of his engine with the smallest possible expenditure of coal and water. To obtain this result the steam must be worked expansively, which is done by placing the valve gear in such a position by means of the lever that the supply of steam to the cylinders is cut off before the piston has accomplished its full stroke. There are two ways of controlling the speed of an engine worked, as all locomotives are worked now, expansively. You may keep the regulator wide open, so that there is always a full supply of steam on its way to the cylinders, in which case you increase or diminish the speed by using the steam more or less expansively through the agency of the lever. Or you may work with the same amount of expansion throughout the journey, and have command of the engine by constantly changing the position of the regulator. There is no doubt that the men who employ the latter method save something by it—although this would hardly seem to be the opinion of the driver who is bringing us rapidly nearer to London, for unlike the driver whom we accompanied on the daylight journey, his hand is not often on the regulator. As we rush on past countless signals, punctual to the minute, yet always having ample time to slacken speed before we come to the places where the different colored lights cluster thickest, we are reminded once more how much is required of an express engineman besides a thorough acquaintance with the machinery he has to control. Traveling at night at a great speed, he must know every inch of the road by heart—where an incline begins and where it ends—and the exact spot at which every signal along the line may be first sighted. He must have completely mastered the working of the traffic on both the up and down lines, and, above all, must be ready to act with the utmost promptitude should anything go wrong.—*Saturday Review.*

A New Car Brake.

Mr. C L. Huber, President of the Kentucky Association of Inventors, has invented a new car brake, which in its essential features is a radical departure from the general run of this class of devices. Its arrangement and operation are so simple and so devoid of complication that a very correct idea of it can be formed from a brief description. Circular friction-plates, 20 inches in diameter, are attached to the axles close to the inside of the wheels, in which position they are held fast by set-screws and revolve with the axles. On the inner side of these friction plates, and above the axles, are the brake-shoes, which are suspended by hangers from the floor timbers of the car body, each of the shoes being attached to toggle-joint levers worked by a central coupling-rod in connection with a draft rod to which the power is applied, which may be either hand or air power. The brake-shoes have a transverse motion to and from the friction-plates, and can be pressed against them with a retarding force that can be graduated according to what may be required. This method, of course, dispenses with brake-beams and entirely relieves the wheels from brake friction. The power is ample, the parts interchangeable, the action quick, and nothing is liable to drop or get down on the track. It is a question, however, to be determined by practical working whether the friction-plates can be held as firmly to the axle by set-screws as they should be; also, whether the requisite power to produce a given amount of retardation will not be very much greater with 20-inch friction plates than with the ordinary brake shoes against the wheel treads. We would also suggest, what will doubtless occur to most car-builders, whether it would not be better to attach the brake-shoe hangers to the safety-beams of the truck instead of the car floor timbers, for the reason that running upon curves the truck frames and floor timbers assume different positions relatively to the track and to each other.

The brake is now being practically tested on the Cincinnati Southern Division of the Cincinnati, New Orleans & Texas Pacific road. It has also received favorable attention from prominent railway men in that vicinity. We hope soon to give a detailed illustrated description of it.

Where are the Electric Motors?

The electricians, or capitalists and patentees interested in electric motors, who have been for months asserting that electrical transmission of power could be economically applied to the moving of railroad trains, are tiresomely slow in reducing their schemes to practice. Months ago we were told, and the assertion was industriously repeated by the daily press, that Mr. Daft was making preparations to lay electric conductors on the Brooklyn Bridge, by which he would at once demonstrate how cheaply and promptly the cars would be moved by electricity. That scheme was suddenly abandoned, without any cause given, and we were then told that Mr. Daft was going to experiment with electric motors on the Ninth Avenue Elevated Railroad. Mr. Daft was wise in his generation in abandoning the Brooklyn Bridge, where heavy tractive power is needed, and the exact power used to move cars by cable can easily be ascertained. He has now got official permission to lay down a conducting rail on the Ninth Avenue road, but week after week passes and nothing is being done to forward the work. Mr. Field's company has got permission to lay a rail on the Second Avenue road, and they also do nothing further in the matter. Come along with your electric motors, gentlemen; the public is waiting for them, and you have roused expectations that ought to be allayed.—*American Machinist.*

Association Meetings.

The *Association of American Railroad Superintendents* will hold its half-yearly meeting in Richmond, Va., on Wednesday, April 15.

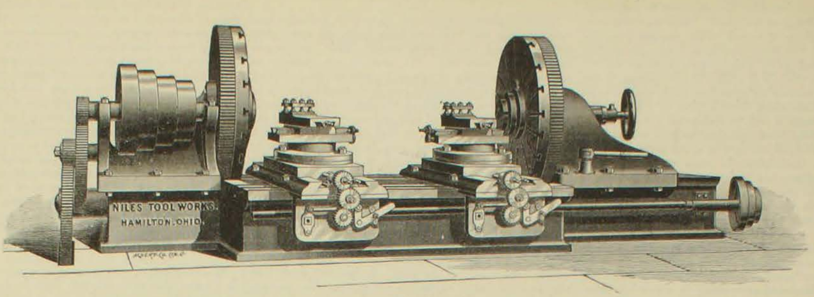
The *Master Car-Builders' Association* will hold its annual convention at the Hygeia Hotel, Old Point Comfort (Fortress Monroe), Va., beginning on Tuesday, June 9.

The *Railway Master Mechanics' Association* will hold its annual convention in Washington, D. C., beginning on Tuesday, June 16.

The *Car Accountants' Association* will hold its annual convention in Minneapolis, Minn., beginning on Tuesday, June 23.

The Niles Tool Works (representing The Gordon & Maxwell Co., of Hamilton, Ohio, and The Morgan Engineering Co., of Alliance, Ohio) will move, on or about April 1, their offices and stock of machinery to 713 Chestnut street, Philadelphia, Pa.

Mr. Joseph M. Rogan, agent for The A. French Spring Co. (Limited) at Chicago, will remove his office on the 1st of May from 246 Clark street to Rooms 13 and 14, Adams Express Building.



IMPROVED DOUBLE-HEAD LATHE FOR TURNING STEEL-TIRED WHEELS.

THE engraving represents a new Double Head Wheel Lathe designed more especially for turning steel-tired wheels. This machine is built by the Niles Tool Works, Hamilton, Ohio.

The extended use of steel-tired wheels necessitates special appliances for truing them up. It may be done in a driving-wheel lathe, but such a machine is not well adapted to the work, and in many shops it cannot be spared for other than its legitimate work. When used for the purpose it is found too slow in its operation to do the work economically. The amount of this work to be done creates a demand for a special machine for the purpose.

The special features in the construction of this lathe are the arrangement of heads and face-plates in such a manner that the wheels are brought up close to the face-plates, and the provision for turning wheels with the axles carried on their journals. By bringing the wheels and face-plates close together, short and stiff drivers may be used, and means may be employed for securing both together so as to drive with great steadiness. Carrying the axles on their journals, enables the machine to carry very heavy cuts without flinching. It is designed, by this means, to carry out the principle adopted for roll-turning, broad tools being used. Wheels carried on centers could not stand the enormous thrust of such a cut. To do this work, a machine of great strength and power is required, and the machine illustrated fills these requirements in every particular.

Each head is provided with a central sliding steel spindle, with centers. When carrying the axles on their journals, these centers are capped and act as thrust-bearings to prevent end-motion of the axle. When required, they are used as centers, and wheels may be turned as in an ordinary lathe. This permits the turning of truck-wheels with journals between the wheels.

The right-hand head is movable by quick hand motion through a rack and pinion. The carriages have compound rests; these rests have power-feed for both the upper and lower slides, so arranged that they can be instantly reversed. The feeds are driven positively by slip gears. The driving cone has four steps for a 5-inch belt, giving a sufficient variation of speed for all sizes of car-wheels. The gearing throughout is accurately cut from the solid.

This lathe is not an experiment. A number are now in use doing excellent work. From four to six pair of 42-inch wheels can be trued up in 10 hours.

The Niles Tool Works have also brought out a lathe (recently patented) for this work, with central driving apparatus located between the wheels. The face-plates and center spindle are made with gaps so as to allow the axles to be rolled freely in and out of the lathe. The driving gear is so arranged that no filling of the gap is required. The tail-stocks are placed upon the outer ends of the machine, and carry the axle on centers or on its journals.

While this lathe has some good features, the Niles Tool Works, after careful experiment, have determined that the machine illustrated above embodies the preferable and only correct principle by means of which the economical turning of steel-tired wheels can be accomplished. It has, therefore, been adopted as their standard machine.

Railroad Racing in Georgia.

Yesterday morning there was an exciting race between two railroad trains coming into Atlanta. Several miles from the city, where the Georgia Pacific and the Western & Atlantic railroads meet, was the beginning point of the race. The state road accommodation was steaming up the river grade, and as it reached the point named, the Georgia Pacific dashed out of the woods, as it were, making the air whizz as it passed along. The two trains were then side by side, and the passengers and train men at once jumped to the conclusion that there was fun ahead. The superior velocity of the Georgia Pacific ran that train half a length ahead, and the passengers on board raised the windows and uttered a series of exultant shouts, made faces at the state road passengers, and some went so far as to put their thumbs to their noses. The state road passengers sent back a defiant yell, and Tom Bussey, the engineer, with a determined expression on his face, motioned his fireman to pile on the coal. Then he steadied himself at the lever and began to draw the throttle back. The engine sprung forward like a spurred charger, and instantly the greatest possible excitement arose among the passengers; even the ladies and children on both trains raised the windows and waved handkerchiefs, cheered and seemed carried away by the excitement of the novel race. Side by side, over fills and through cuts, the trains sped, amid the wildest enthusiasm. At last Tom Bussey's fireman had things red hot, and the engine began to move up on its competitor. The Georgia Pacific was left behind inch by inch, and as the state road train swept ahead Tom Bussey simply raised his hat to his vanquished brother and said: "Good evening."—*Atlanta (Ga.) Constitution, Jan.* 11.

American Pumps in the Desert.

An American firm has received from the British government a heavy contract for pumping engines, to be used in forcing water across the desert between Suakim and Berber, for the supply of the British troops in Egypt. The distance, in a direct line, is about 260 miles, but owing to the absence of water, the route is almost impassable. The British War Office some time ago sanctioned the plan for a pipe line similar to those adopted in the United States for the conveyance of oil, and Henry R. Worthington, of New York, was recently awarded the contract for engines, of which probably 20 will be required, of 150 to 200 horse-power each. So far as known at present, the pipes will be furnished by English manufacturers, although it is possible that a considerable portion of the work will be given to Americans, whose experience in the Pennsylvania oil regions affords ample proof of ability to overcome obstacles far more difficult than any to be encountered in the deserts back of the Nile. The pipes required will be 4 inches in diameter, and a tank and two engines—one as a reserve—will be stationed every 30 miles with ability to furnish water at the rate of 110 gallons a minute, the pressure at command being equal to 2,000 pounds per square inch. Two engines have already been shipped, and others will follow every week. To provide for the special exigencies of the service, the pipes will be laid in a zigzag course, to allow for expansion or contraction under changes of temperature, and the lengths are connected by a screw sleeve coupling. Measures will be taken to promptly discover and repair any break or injury which might arise from accident or willful intent.

Report of Third Annual Meeting of the American Street Railway Association.—This report is very full and voluminous, covering 212 pages, and containing reports of committees, letters read at the meeting, verbatim report of discussions at the business sessions and banquet, and a great deal of collateral matter, including list of members and the constitution and by-laws of the association. There is also a frontispiece portrait of Wm. H. Hazzard, President of the Brooklyn City Railroad Co., and a "diphtheria" map of the city of Brooklyn, showing the street railway lines.

MR. GEO. H. CAREY, general Eastern agent of the Dayton Manufacturing Co., Dayton, Ohio, has removed his office to "Washington Building," No. 1 Broadway, New York, where he will be pleased to see his numerous friends.

THE CINCINNATI CORRUGATING CO. have just issued a new illustrated catalogue of their corrugated sheet-iron products, the superiority of which for roofing, siding, ceilings, etc., is widely recognised. The company have raised their standard of manufacture to the highest degree of perfection in respect to quality, material and workmanship. By means of improved machinery and methods, the corrugated sheets are made with uniform depth of channels, free from warps, holes and other imperfections. Provision is also made for contraction and expansion without displacing the sheets, there is no solder to crack off, the sheets are easily put on or taken off, and never wear out if they are kept properly painted. They do not sag, buckle nor corrode, and are fire, wind and water-proof. The catalogue is accompanied with an extensive list of the names of the company's representative customers in all parts of the country, and contains full information with respect to forms and sizes and methods of application. The company also manufacture the packed standing seam iron roofing, and are the successors of the New York Iron Roofing & Paint Works, and owners of the patent on this style of roofing.

WE have received from The A. French Spring Company (Limited), of Pittsburgh, a unique and attractive bronze card. Its dimensions are about 10 × 12 inches, exclusive of the frame. In addition to appropriate lettering it contains raised designs representing the face and bust of Mr. A. French, the three mills of the company, an elliptic spring, and a spiral spring.

THE PEERLESS MANUFACTURING CO., of Louisville, Ky., announce that its sales office will hereafter be at No. 15 Gold street, New York, under the control of Messrs. Thomas Prosser & Son. These nut-locks were last year put in for trial on the Louisville & Nashville; Chicago, Milwaukee & St. Paul; Ohio & Mississippi; Indianapolis Union; Savannah, Florida & Western; Wheeling & Lake Erie; Chicago, Rock Island & Pacific; Chicago & Northwestern; Atchison, Topeka & Santa Fé, and Indianapolis & Vincennes roads. The road-masters of these roads, without exception, report in January last that they are both cheap and effective.

THE CONGDON BRAKE-SHOE CO. have decided to reduce the price of shoes from 4 cents to 3¼ cents a pound. This is a very liberal reduction, and will no doubt be freely responded to by all railway companies who know the merits of the shoe.

THE WOODRUFF SLEEPING & PARLOR COACH CO., at its annual meeting in Philadelphia, March 17, elected the following directors: Job H. Jackson, Wm. G. Johnston, E. Poulson, J. M. McClintock, E. J. Unger, Chas. I. Travelli, Wilson McCandless, Henry Whelen and Jas. J. Donnell. The Board also elected Job H. Jackson, President; Wm. G. Johnston, Vice-President; Augustus Trump, Secretary and Treasurer, and John C. Paul, General Manager.

VALENTINE & COMPANY, of New York, the well-known varnish manufacturers, have issued a pamphlet of 200 pages, containing price-lists and descriptions of their coach and car varnishes and colors; also, upward of 600 testimonials of the users of their products in this country and abroad; a partial illustrated list of medals and awards received from national and international expositions; and directions and explanations relative to the use and application of colors and varnishes, that will be of service in every paint shop where it is the aim to do first-class work.

Our Directory.

We note the following changes since our last issue. Our readers will do us a great favor by giving us prompt notice of any changes that may come to their knowledge or of any errors that may be noticed in our list:

Bennington & Rutland.—E. D. Bennett has been appointed Superintendent, in place of F. C. White, deceased.

Canadian Pacific.—W. H. Kelson, heretofore General Storekeeper at Winnipeg, has been transferred to Montreal, and will have charge of the company's stores on all divisions.

Chicago, Milwaukee & St. Paul.—Roswell Miller, heretofore Assistant General Manager, has been appointed General Manager in place of S. S. Merrill, deceased. Joseph F. Tucker succeeds Mr. Miller as Assistant General Manager.

East Tennessee, Virginia & Georgia.—C. H. Hudson has been appointed General Manager, and John F. O'Brien Assistant General Manager. The office of General Superintendent is abolished.

Humeston & Shenandoah.—E. C. Murphy has been appointed Superintendent, in place of C. H. Warren, deceased.

Louisville & Nashville.—Harvey Middleton has been appointed Superintendent of Machinery in place of Reuben Wells, now General Manager. Mr. Middleton has been for some time Master Mechanic of the St. Paul, Minneapolis & Manitoba road.

Louisville, New Orleans & Texas.—M. Burke has been appointed General Superintendent.

Mississippi & Tennessee.—James M. Edwards has been appointed General Manager. He is also General Manager of the Louisville, New Orleans & Texas.

Missouri Pacific.—John Hewitt and O. Y. Haynes having been placed in charge of the car department, they will hereafter be known as Superintendents of Locomotive and Car Departments, Mr. Hewitt having charge of both departments north of Denison and Texarkana, and Mr. Haynes having charge of both departments south of and including these points.

New York, West Shore & Buffalo.—Charles W. Bradley has been appointed General Superintendent in place of C. D. Gorham, resigned.

Philadelphia & Reading.—G. W. Twining has been appointed Superintendent of the Lehigh and Susquehanna Division, vice W. S. Polhemus, resigned.

St. Paul, Minneapolis & Manitoba.—Thomas Downing has been appointed Master Mechanic in place of H. Middleton, who has gone to the Louisville & Nashville.

Texas & St. Louis.—W. H. Adams is now Superintendent of the Missouri and Arkansas Division, in place of J. R. Hastings, and Richard Williams, late of the Brooks Locomotive Works, is Master Mechanic.

Valley of Ohio.—James E. Turk has resigned as Superintendent, and C. T. Johns has been appointed Master Mechanic and Master Car-Builder.

Employment.

WANTED.—By a competent man of experience and with good recommendations, a position as master mechanic and car-builder on a first-class railroad; or as superintendent in charge of construction; or as contracting agent of a railroad rolling stock and supply company. Address, "D. O. N.", office of NATIONAL CAR BUILDER.

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This book is twice as large as the original edition, and contains 2,188 engravings, including exact engravings of American Cars of every description, and of the different kinds of Trucks, Wheels, Brakes, Couplings, Seats, Lamps, Heaters, and all Car Furnishings in general use, in the minutest detail. All the detail drawings are made to scale, and each engraving is briefly described under the definition of its name. All terms in general use in car-building are defined. This is the most elegant, as well as the most valuable book on American cars ever published, and forms a volume in character and appearance such as usually sold for $5.00. No one connected in any capacity with car-building can afford to be without a copy for study and reference.

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A NEW BOOK

Which every Railway Man should possess.

THE BIOGRAPHICAL DIRECTORY OF THE RAILWAY OFFICIALS OF AMERICA.

This remarkably interesting and useful book, which has been in careful preparation more than a year, is now ready for delivery, and as only a limited edition has been printed, it is important that all who desire copies shall send their orders soon. It consists of an alphabetically arranged list of the general, assistant-general and division railway officers of the United States, Canada and Mexico, with the official position and business address of each, and a brief detailed history of the railway career of most of them, together with excellent portraits of the following prominent gentlemen:

Charles Francis Adams, Pres't U. P. R. R. Co.; John I. Blair, Pres't or Director various R. R. Co.'s; Col. E. W. Cole, ex-President East Tennessee, Virginia & Georgia R. R. Co.; Chas. Crocker, Pres't S. P. R. R. Co. and 2d Vice-President C. P. R. R. Co.; Albert Fink, Com'r Trunk Line Pool; John W. Garrett, Late Pres't B. & O. R. R. Co.; Jay Gould, Pres't M. P. R. R. Co.; F. K. Hain, Gen'l Manager Elevated R. Rs. of New York City; Robert Harris, Pres't N. P. R. R. Co. Joseph Hickson, Gen'l Manager G. T. Ry; C. P. Huntington, Pres't C. & O. Ry. Co., etc.; Hugh J. Jewett, Ex-Pres't N. Y., L. E. & W. R. R. Co.; S. S. Merrill, Gen'l Manager C., M. & St. P. Ry.; Alex. Mitchell, Pres't same Co.; Thos. W. Peirce, Pres't G., H. & S. A. Ry. Co.; Virgil Powers, Com'r Southern Ry. & Steamship Assoc'n; Geo. B. Roberts, Pres't P. R. R. Co.; Jas. H. Rutter, Pres't N. Y. C. & H. R. R. R. Co.; Thos. A. Scott, Late Pres't P. R. R. Co.; Wm. B. Strong, Pres't A., T. & S. F. R. R. Co.; Sam'l Sloan, Pres't D., L. & W. R. R. Co; Leland Stanford, Pres't C. P. R. R. Co.; George Stephenson, originator of the Locomotive; A. N. Towne, Gen'l Manager C. P. R. R.; Wm. H. Vanderbilt, Ex-Pres't N. Y. C. & H. R. R. R. Co.; Henry Villard, Pres't California & Oregon R. R. Co., and Ex-Pres't N. P. R. R. Co.

This is the only work of its kind ever published, and its value as a book of reference, to railway men of all grades must be apparent, while its history of the successive steps by which those in charge of our iron highways have risen to their present positions is exceedingly interesting and instructive.

It consists of over 300 pages, is clearly printed and handsomely bound in cloth, and contains the names of over 3,000 railway officers. It has been compiled from original sources by the editors of the *Railway Age* and cannot fail to become a standard work.

The fact that it will be revised and extended at the close of each year, and issued as an "Annual," makes it doubly important to possess this, the initial volume, in order that sets may be complete.

This book will be found to be especially valuable to all engaged in railway work, who are interested in the railway history of their co-workers who have achieved positions of prominence.

Price of Directory, postage paid by us, $4.00; two copies, $7.50; three copies, $10.00. Orders may be addressed either to our Chicago or New York office, as may be be most convenient.

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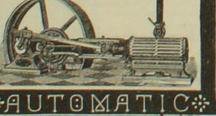

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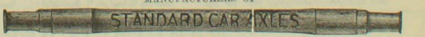

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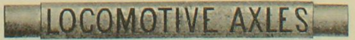

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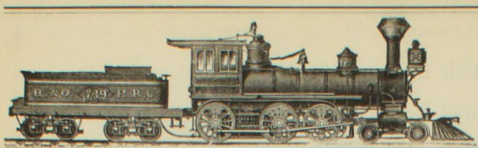

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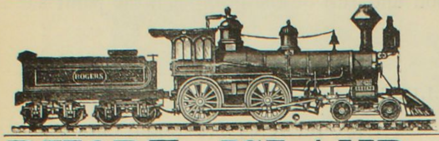

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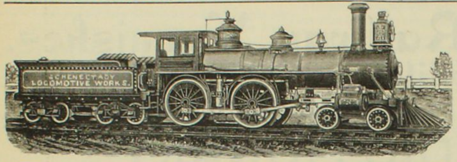

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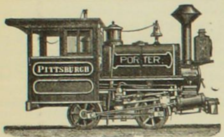

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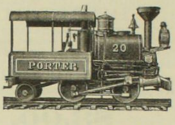

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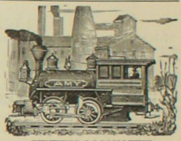

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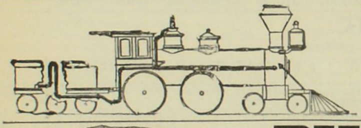

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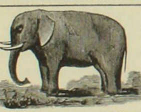

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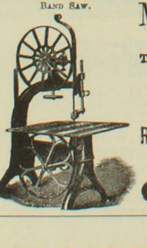

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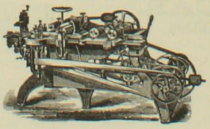

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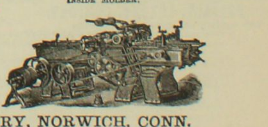

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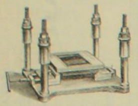

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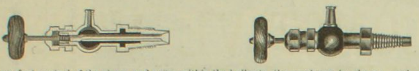

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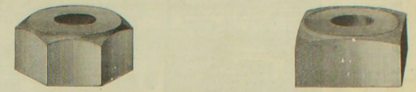

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REVISED EDITION, PUBLISHED DECEMBER, 1884.

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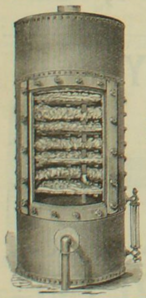
STILWELL'S

PATENT LIME-EXTRACTING

HEATER AND FILTER

COMBINED,



Is the only lime-extracting Heater that will prevent scale in steam boilers, removing all impurities from the water before it enters the boiler.

Thoroughly tested.

OVER 3,000 OF THEM IN DAILY USE.

This cut is a fac-simile of the appearance of a No. 5 Heater at work on ordinary lime water when the door was removed, after the Heater had been running two weeks.

Illustrated Catalogues.

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IMPORTED RUSSIA IRON,

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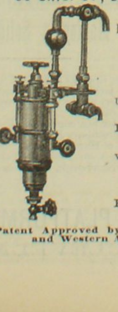

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Nine pounds of our *Packing* takes the place of *fifteen* pounds of cotton or wool waste, giving *perfect lubrication* and showing a large *saving in oil.*

Particular attention is called to the *elasticity* of our *Packing*, which causes it to *hold up* to the journal and prevents it from sagging when saturated with oil, thus proving it *superior* to any *Packing* ever introduced.

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JERSEY CITY NEW JERSEY.

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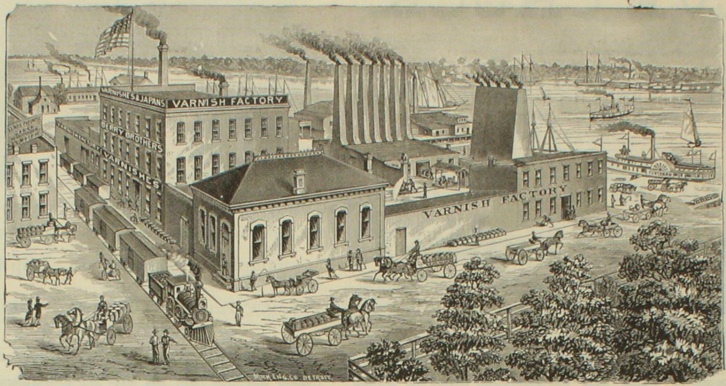

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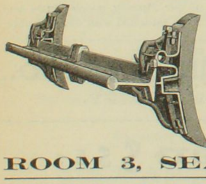

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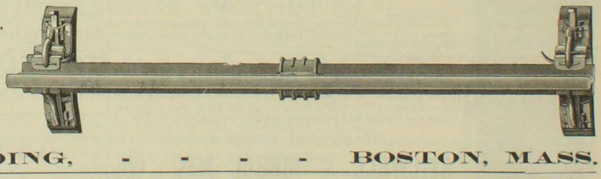

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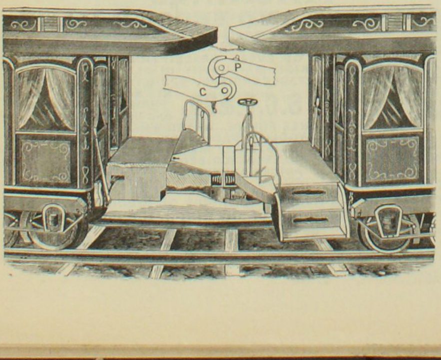

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of the Railroads of the United States and Canada, showing the gauge, length of road, number of locomotives and number of cars; and giving the names and titles of their principal officers in charge of the operating, purchasing and rolling stock departments.

A

Adirondack R. R. 4-8½ gauge 60 m. 3 lo. 62 cars.
C. E. Durkee, *Supt* ....Saratoga, N. Y.
Jacob Myers, *M. M* ....Saratoga, N. Y.
Jas. J. Traver, *M. C. B*.........Saratoga, N. Y.
Addison & Northern Penn'a Ry. 3 g. 51 m. 5 lo. 50 c.
F. M. Baker, *Gen. Supt* ....Addison, N. Y.
Alabama Great So'n R. R. (*See Cin., N. O. & T. P.*)
Albany & Susquehanna R. R. (*See D. & H. Canal Co.*)
Albemarle & Raleigh R. R. 4-8½ g. 33 m. 3 lo. 35 c.
Jas. H. Petty, *Gen. Supt*.......Tarboro, N. C.
Albert Ry 4-8½ g. 51 m. 3 lo. 35 cars.
G. A. Robinson, *Man. & Pur. Agt.* Hillsboro, N. B.
Jas. McKay, *M. M. & C. B*......Hillsboro, N. B.
Alexandria & Fredericksburg Ry. (*See Penna. R. R.;*
Alexandria & Washington R. R. (7) *Div.*
Allegheny Valley R. R. 4-9 g. 259 m. 70 lo. 2202 c.
David McCargo, *Gen. Supt. & Pur. Agt.*; and
C. B. Price, *Supt.* (Riv. Div.).....Pittsburg, Pa.
A. A. Jackson, *Supt.* (L. G. Div.). Reynoldsville, Pa.
W. A. Wood, *M. M*...............Verona, Pa.
R. Gunning, *M. C. B*............Verona, Pa.
Alliance, Niles & Ashtabula R. R. (*See Penna. Co.*)
Annapolis & Elk Ridge R. R. 4-8½ g. 20 m. 4 lo. 29 c.
W. H. Bians, *Supt. & Pur. Agt*..Annapolis, Md.
John L. Beall, *M. Mach*........Annapolis, Md.
Anniston & Atlantic R. R. 3 g. 9 m.
Tho. K. Scott, *Supt*. ....Anniston, Ala.
Antwerp & Paulding R. R. 4-8½ g. 6 m. 4 lo. 63 c.
E. C. Munson, *Gen. Man*.........Antwerp, O.
William Fitzsimmons, Jr., *Pur. Agt.* Antwerp, O.
Arizona & New Mexico Ry. 3 g. 71 m. 3 l. 60 cars.
W. H. Jones, *Gen. Supt. & P. A.* Lordsburg, N. M.
W. C. Boylan, *M. M. & M. C. B.* Lordsburg, N. M.
Arkansas Midland R. R. 3-6 g. 63 m. 4 lo. 45 cars.
A. H. Johnson, *Pr. & Gen. Man*...Helena, Ark.
J. B. Johnson, *M. M. & M. C. B*...Helena, Ark.
Arkansas & Louisiana Ry. 4-8½ g. 28 m.
J. D. Beardsley, *Supt*.........Washington, Ark.
Asheville & Spartanburg R. R. 5 g. 49 m. 2 lo. 12 c.
Jas. Anderson, *Supt. & Pur. Agt*..Spart'b'g, S. C.
M. M...........Spartanburg, S. C.
Ashland Coal & Iron Ry. 4-8½ g. 22 m. 7 lo. 432 c.
Douglas Putnam, Jr., *Gen. Supt.* Ashland, Ky.
Robt. Peebles, *Pur. Agt*..........Ashland, Ky.
E. M. Roberts, *M. M*.............Ashland, Ky.
Ashtabula & Pittsburgh Ry. (*See Penna. Co.*)
Atchison, Topeka & Santa Fé R. R.
4-8½ g. 2,620 m. 348 lo. 9,629 cars.
A. A. Robinson, *Gen. Man*........Topeka, Kan.
Geo. B. Harris, *Asst. Gen. Man*...Topeka, Kan.
Geo. Hackney, *Supt. Mach*........Topeka, Kan.
Clem. Hackney, *Asst. Sup. Mach. Dept.* do.
Geo. Hargraves, *Pur. Agt*........Topeka, Kan.
Eastern Div.: D. J. Chase, *Supt.*....Topeka, Kan.
Henry Hull, *G. F. Car Dept*.....Topeka, Kan.
John Fagan, *M. M*..............Atchison, Kan.
J. M. Smith, *M. M*..........Kansas City, Mo.
Alfred Taylor, *M. M*...........Emporia, Kan.
Mid. Div.: H. R. Nickerson, *Supt.* Nickerson, Kan.
W. Y. Johnson, *M. M*..........Nickerson, Kan.
W. Div.: C. M. Rathburn, *Supt*.....La Junta, Col.
A. C. Stiles, *M. M*...............La Junta, Col.
D. H. Dotterer, *M. M*...........Raton, N. M.
Las Vegas Div.: Chas. Dyer, *Supt.* Las Vegas, N. M.
F. B. Woodruff, *M. M*.......Las Vegas, N. M.
J. H. Holman, *M. M*...........Wallace, N. M.
Rio Gr. Div.: P. F. Barr, *Supt.* San Marcial, N. M.
E. Hackett, *M. M*..........San Marcial, N. M.
H. P. Olcott, *M. M*..............Deming, N. M.
Geo. A. Hancock, *M. M*..........El Paso, Tex.
Sonora Div.: 265 m.
L. H. Waugh, *M. M*..........Guaymas, Mex.
Kan. Cy., Law. & So. Kan.
4-8½ g. 399 m. 24 lo. 787 c.
J. L. Barnes, *Supt*..............Lawrence, Kan.
T. D. Volk, *M. M*...............Ottawa, Kan
Atlanta & West Point R. R. (*See Western of Ala.*)
Atlantic & Danville Ry. 3 g. 17 m.
E. G. Sweatt, *Gen. Man*...........Waverly, Va.
Atlantic & North Carolina R. R. (*See Midland; N. C.*)
Atlantic, Tenn. & Ohio R. R. (*See Rich. & Dan.; (2) Div.*)
Atlantic & Pacific R. R. 4-8½ g. 575 m.
F. W. Smith, *G. Supt*.........Albuquerque, N. M.
F. P. Wherry, *Pur. Agt*..........St. Louis, Mo.
Geo. Chalender, *Supt. M. P. & M.*, and
Geo. F. Chalender, *A. Supt.* Albuquerque, N. M.
Augusta & Knoxville R. R. (*See Port Royal & Aug.*)
Austin & Northwestern R. R. 3 g. 60 m. 5 lo. 75 c.
J. A. Rhomberg, *Gen. Man*........Austin, Tex.

B

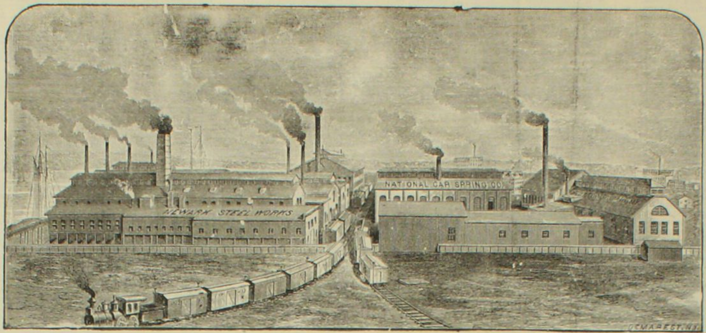
Bachman Valley R. R. (*See Han. Junc., Han. & Gett.*)
Balt. & Delaware Bay R. R. 4-8½ g. 50 m. 2 lo. 13 c.
Fred Gerker, *Gen. M. & P. A.* Chestertown, Md.
Baltimore & Hanover R. R. (*See H. J., H. & G.*)
Baltimore & Ohio R. R.
4-8½ g. 1,612 m. 574 lo. 17,339 cars.
B. Dunham, *Gen. Man*..........Baltimore, Md.
N. S. Hill, *Pur. Agt*...........Baltimore, Md.
Main Stem Div.: 4-8½ g. 972 m.
W. M. Clements, *Gen. Supt*...Baltimore, Md.
A. J. Cromwell, *M. of M*......Baltimore, Md.
E. W. Grieves, *M. C. B*.........Baltimore, Md.
Andrew Beckett, *M. M*.........Baltimore, Md.
Wm. Edwards, *M. M*...Martinsburg, W. Va.
Sam. Houston, *M. M*.........Piedmont, W. Va.
Robert Maxwell, *M. M*......Cumberland Md.
W. P. Harris, *Supt. West of* Cumberland, Md
S. B. Crawford, *M. M*..........Grafton, W. Va.
Alex. Laird, *M. M*.......Parkersburg W. Va.
W. B. McClung, *M. M*.......Wheeling, W. Va.
Pitts. Div.: J. T. Harahan, *Gen. Supt.* Pittsburgh, Pa
I. N. Kalbaugh, *M. of M*.....Connellsville, Pa.
Trans-Ohio Divs.: G. J. Foreacre, *G. Supt.* Newark, O.
W. H. Harrison, *M. of Mach*..........Newark, O.
E. L. Weisgerber, *M. M*.............Newark, O.
H. M. Ingler, *M. M*...............Bellaire, O.
O. B. Perkins, *M. M*............Zanesville, O.
Thos. Taylor, *M. M*..............Sandusky, O.
F. J. Gunther, *M. M*.....Chicago Junction, O.
Chi. Div.: F. H. Britton, *Supt. Trans.* Chicago, Ill.
Benj. Lowther, *M. M*..............Garrett, Ind.
W. H. Wilkinson, *M. M*..........Kingston, Ill.
Newark & Straitsville Div.: N. Criswell, Shawnee, O.
Baltimore & Philadelphia 4-8½ g. 40 m. 7 lo. 35 c.
B. Dunham, *Gen. Man*...........Baltimore, Md.
D. Connell, *Supt*..............Wilmington, Del.
Baltimore & Potomac R. R. (*See Penna. R. R.; (7) Div.*)
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brown, *Supt. & Pur. Agt*..Bangor, Me.
C. S. Nason, *M. M*...................Bangor, Me.
J. W. Comins, *M. C. B*..............Oldtown, Me.
Bangor & Portland Ry. 4-8½ g. 25 m. 3 lo. 3 c.
C. Miller, *Pres. & Gen. Man*...Blairstown, N. J.
Barclay R. R. 4-8½ g. 16 m. 6 l. 200 c.
F. F. Lyon, *Supt*.....................Barclay, Pa.
J. A. Hardenburg, *Pur. Agt*..21 Cort. st., N. Y.
Wm. Johnson, *M. M*...............Towanda, Pa.
Batesville & Brinkley R. R. 3 g. 40 m. 3 lo. 42 c.
R. W. Martin, *Pres*..............Little Rock, Ark.
W. J. Thompson, *Gen. Man*..Little Rock, Ark.
E. Summerfield, *Gen. Supt*......Brinkley, Ark.
John White, *M. M*.................Brinkley, Ark.
Bath & Hammondsport R. R. 3 g. 10 m.
Allen Wood, *Gen. Man*..Hammondsport, N. Y.
Baton Rouge, Grosse Tête & Opelousas R. R.
5-6 g. 29 m. 3 lo. 12 c.
D. C. Montan, *Gen. Supt*..........Port Allen, La.
Bedford & Bloomfield Ry. 3 g. 43 m. 5 lo. 86 cars.
Jas. W. Kennedy, *Gen. Supt. & Pur. Agt.*; and
Capt. John Thumser, *M. M*........Bedford, Ind.
Jas. Richards, *M. C. B*...........Bedford, Ind.
Bellaire, Zanesville & Cin. Ry. Co. 3 g. 112 m 5 lo. 71 c
S. L. Mooney, *Pres*................Woodsfield, O.
W. R. Crumpton, *Gen. Man*......Zanesville, O.
C. E. Hill, *M. M*....................Zanesville, O
Bell's Gap R. R. 4-9 g. 25 m. 5 lo. 148 cars.
R. G. Ford, *Supt. & Pur. Agt*....Bellwood, Pa.
Geo. Van Brunt, *M. M*...........Bellwood, Pa.
A. Zimmerman, *M. C. B*..........Bellwood, Pa.
Belt R. R. 4-8½ g. 12 m. 10 lo.
W. P. Ijams, *Supt*...............Indianapolis, Ind.
Belt Ry. 4-8½ g. 27 m.
Jas. D. Carson, *Gen. Man*..........Chicago, Ill.
R. W. Johnson, *M. M*..............Chicago, Ill.
Bennington & Glastonbury. 4-8 g. 10 m.
R. C. Root, *Pres*................Bennington, Vt.
Bennington & Rutland Ry. 4-8½ g. 59 m. 10 lo. 236 c.
E. D. Bennett, *Supt. & Pur. Agt.* Bennington, Vt.
G. W. Blanchard, *M. M*.............Rutland, Vt.
Berlin Branch R. R. (*See Han. Junc., Han. & Gett.*)
Bingham, Canyon & Camp Floyd (*See Den. & Rio Gr.*)
Bladen, Columbus & Florida. 4-8½ g. 16 m 2 lo. 2 c.
John Colville, *Pres*..........Wilmington, N. C.
Bodie & Benton Ry. & Com. Co. 3 g. 34 miles.
Thomas Holt, *Supt. & Pur. Agt*.....Bodie, Cal
E. H. Barton, *M. M. & C. B*.........Bodie, Cal.
Boston, Barre & Gardner. 4-8½ g. 37 m. 8 lo. 108 c.
H. H. Marshall, *Supt. & P. A*..Worcester, Mass.
Frank I. Goodwin, *M. M*.....Worcester, Mass.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 87 m. 18 lo. 1,038 cars.
H. L. Morrill, *Gen. Man*..Mechanicsville, N. Y.
C. H. Cory, *Pur. Agt*.....Mechanicville, N. Y.
C. H. Cory, *Supt. & M. M*..Mechanicville, N. Y.
John S. Ellis, *M. C. B*......Mechanicville, N. Y.
Boston, Revere Beach & Lynn R. R. 3 g. 9 m. 7 lo. 46 c.
C. A. Hammond, *Supt. & P. Agt.* Boston, Mass.
R. D. Sutherland, *M. M*...........Boston, Mass.
John Coghlan, *M. C. B*...........Boston, Mass.
Boston, Winthrop & Point Shirley R. R.
3 g. 10 m. 1 lo. 8 c.
C. A. Parks, *Supt*...................Boston, Mass.
J. W. Davis, *M. M*...............Winthrop, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 245 lo. 6,111 c.
W. H. Barnes, *Gen. Man*...........Boston, Mass.
Edw. Gallup, *Gen. Supt*......Springfield, Mass.
A. B. Underhill, *Supt. M. P*...Springfield, Mass.
F. D. Adams, *Gen. M. C. B*.......Allston, Mass.
J. T. Chamberlain, *For. C. shop* Allston, Mass.
H. B. Chesley, *Div. Supt*...........Boston, Mass.
G. H. Colby, *Div. M. M*...........Boston, Mass.
C. E. Grover, *Div. Supt*....Springfield, Mass.
H. W. Eddy, *Div. M. M*....Springfield, Mass.
J. B. Weston, *For. Car Sh.* Springfield, Mass.
W. H. Russell, Jr., *Div. Supt.* E. Albany, N. Y.
T. B. Purvis, *Div. M. M*..East Albany, N. Y.
J. E. Doran, *For. Car Sh*..East Albany, N. Y.
Boston & Lowell R. R.
4-8½ g. 555 m. 147 lo. 3,262 cars.
C. S. Mellen, *Gen. Supt*..........Boston, Mass.
F. H. Nourse, *Pur. Agt*...........Boston, Mass.
Jas. K. Taylor, *Supt. R. S. & M.* Concord, N. H.
So. Div.: J. F. Crockett, *Supt*.....Boston, Mass.
H. S. Kolseth, *M. M*..............Boston, Mass.
No. Div.: Geo. A. Todd, Supt.....Concord, N. H.
C. C. Aspinwall, *M. M*..........Concord, N. H.
Wh. Mount Div.: W. A. Stowell, *Supt.* Concord, N. H.
Geo. A. Ferguson, *M. M*...Lake Village, N. H.
Boston & Maine R. R. 4-8½ g. 491 m. 209 lo. 4,660 c.
J. T. Furber, *Gen. Man*...........Boston, Mass.
Geo. J. Fisher, *Pur. Agt*..........Boston, Mass.
Wm. Smith, *Supt. M. P*...........Boston, Mass.
D. C. Richardson, *M. C. B*.....Lawrence, Mass.
West. Div.: Wm. Merritt, Jr., *Supt.* Boston, Mass.
East. Div.: D. W. Sanborn, *Supt*..Boston, Mass.
North Div.:
J. W. Sanborn, *Supt*..Wolfboro Junc., N. H.
Boston & N. Y. Air Line R. R. (*See N. Y., N. H. & H.*)
Boston & Providence R. R. 4-8½ g. 67 m. 52 lo. 1,006 c.
A. A. Folsom, *Gen. Supt. & P. A.* Boston, Mass
Geo. Richards, *M. M*............Roxbury, Mass.
Jno. Lightner, *M. C. B*..........Roxbury, Mass.
Bowling Green & Toledo R. R 4-8½ g. 6 m. 2 lo. 4 c.
Wm. A. Wiggins, *Gen. Man.* Bowling Green, O.
Wm. A. Wiggins, *Pur. Agt*..Bowling Green, O.
Bradford, Bordell & Kinzua R. R. 3 g. 42 m. 6 lo. 82 c.
Bradford, Eldred & Cuba. 3 g. 54 m. 6 l. 158 c.
Tonawanda Valley & Cuba. 3 g. 60 m. 5 lo. 31 c.
J. V. D. Loomis, *Supt*...............Attica, N. Y.
Jno. Delaney, *M. M. & C. B*.......Bradford, Pa.
Brattleboro' & Whitehall R. R. 3 g. 36 m. 3 lo. 56 c.
(*Operated by Central Vermont.*)
Breakwater & Frankford R. R. (*See Del., Md. & Va.*)
Bridgton & Saco River R. R. 2 g. 16 m. 2 lo. 19 c.
Wm F. Perry, *Gen Supt*.........Bridgton, Me.
M. M. Caswell, *M. M. & Pur. Agt.* Bridgton, Me.
Brighthope Ry 3 g. 37 m. 4 lo. 193 cars.
Jas. R. Worth, *Supt*.............Richmond, Va.
P. M. Buckingham, *Pur. Agt* Richmond, Va.
A. Gary, *Supt. Way & Works.* Winterpock, Va.
Robt. Kredell, *M. M*..............Chester, Va.
Brooklyn, Bath & Coney Island R. R.
4-8½ g. 7 m. 8 lo. 36 cars.
Geo. A. Gunther, *Gen. Man*...Brooklyn, N. Y.
Aug. Wolff, *M. M*..................Brooklyn, N. Y.
Brooklyn, Flatbush & Coney Island Ry.
4-8½ g. 8 m. 8 lo. 54 c.
J. L. Morrow, *Supt. & P. A*...Brooklyn, N. Y.
Wm. Finley, *M. M*..............Brooklyn, N. Y.
Brooklyn & Rockaway Beach R. R.
4-8½ g. 3 m. 2 lo. 18 cars.
Wm. Warner, *Supt*.....East New York, N. Y.
Brunswick & Western R. R. 5 g. 172 m. 13 lo. 170 c
H. S. Morse, *Gen. Man. & P. A*..Brunswick, Ga.
C. R. Will, *Asst. Gen. Man*....Brunswick, Ga.
W. R. Kline, *M. M*..............Brunswick, Ga.
Buff., N. Y. & Phil. R. R. 3 & 4-8½ g. 655 m. 120 l. 6,339 c.
Geo. S. Gatchell, *Gen. Supt*......Buffalo, N. Y.
W. W. Halsey, *Asst. to G. Supt*..Buffalo, N. Y.
Allen Vail, *M. M*...................Buffalo, N. Y.
Buff. Div.: Henry Dwyer, *Supt*....Buffalo, N. Y.
Roch. Div.: J. R. Watson, *Supt*.......Olean, N. Y.
Pitts. Div.: E. H. Witter, *Supt*......Oil City, Pa.
H. J. Bookhammer, *M. M*........Oil City, Pa.
C. E. Turner, *M. M*.................Olean, N. Y.
Burlington, Cedar Rapids & Northern Ry
4-8½ g. 989 m. 96 lo. 4,206 cars.
C. J. Ives, *Pres & Gen. Supt.* Cedar Rapids, Ia.
Robt. Williams, *Gen. Supt*...Cedar Rapids, Ia.
T. Stickney, *Pur. Agt*..........Cedar Rapids, Ia.
R. W. Bushnell, *M. M. & C. B.* Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 35 m. 4 lo. 64 c.
G. L. Linsley, *Gen. Man. & Supt.* Burlington, Vt.
F. G. Brownell, *M. M*...........Burlington, Vt.
Burlington & Mo. Riv. R. R. (in Neb.) (*See C. B. & Q.*)
Burlington & North-West'n Ry. 3 g. 38 m. 3 lo. 97 c.
Burlington & Western R. R. 3 g. 15 m. 38 c.
E. S. Edger, *Supt*.................Burlington, Ia.
Burlington & Ohio River R. R. 4-8½ g.
R. Tanner, *Pur. Agt*...............Chicago, Ill.

C

California Northern R. R. 4-8½ g. 26 m 2 lo. 17 c.
Andrew J. Binney, *Gen. Man*..Marysville, Cal.
California Southern R. R. 4-8½ g. 127 m. 13 lo. 301 c.
J. N. Victor, *Supt*...........National City, Cal.
J. M. Keith, *M. M*..........National City, Cal.
Cambridge & Seaford. (*See Penna. R. R.; (4) Div.*)
Camden & Atlantic R. R. (*See Penna. R. R.; (2) Div.*)
Canada Southern Ry. (*See Mich. Cen.; (2) Div.*)
Canada Atlantic Ry. 4-8½ g. 135 m.
D. C. Linsley, *Man*..................Ottawa, Ont.
M. Donaldson, *M. M*...............Ottawa, Ont.
Canadian Pacific R. R. 4-8½ g. 1,742 m. 118 l. 2,726 c
W. C. Van Horne, *Gen. Man*....Montreal, Can.
Francis R. F. Brown, *Mech. Supt.* Montreal, Can.
W. H. Kelson, *Gen. Storekeeper* Montreal, Can.
E. Div.: Archer Baker, *Gen. Supt.* Montreal, Can.
W. Div.: J. M. Egan, *Gen. Supt*..Winnipeg, Man.
Ontario Div.: W. White, *Gen. Supt* Montreal, Can.
Cape F'r & Yadkin Val. R. R. 4-8½ g. 112 m. 7 lo. 60 c.
W. M. S. Dunn, *Gen. Supt*...Fayetteville, N. C.
Isaac W. Clark, *M. M. & C. B*..Fayetteville, N. C.
Cape Girardeau Southwestern Ry.
4-8½ g. 52 m. 3 lo. 51 cars.
Louis Houck, *Gen. Man*..Cape Girardeau, Mo.
W. A. Penney, *Supt*.......Cape Girardeau, Mo.
D. L. Meyers, *Pur. Agt*....Cape Girardeau, Mo.
Fred Glover, *M. M*.........Cape Girardeau, Mo.
Carolina Central R. R. (*See Ral. & Aug.*)
Carillon & Grenville Ry. 5-6 g. 13 m.
R. W. Shepard, *Pres*.............Montreal, Can.
Carson & Colorado R. R. (*See Va. & Truckee*).
Catasauqua & Fogelsville. 4-8½ g. 25 m. 6 lo. 581 c.
C. W. Chapman, *Supt. & P. A.* Catasauqua, Pa.
J. Thomas, *M. M*..............Hokendauqua, Pa.
Chas. J. Holbach, *M. C. B*....Catasauqua, Pa.
Catskill Mountain R. R. 3 g. 16 m. 2 lo. 26 cars.
Charles A. Beach, *Supt*..........Catskill, N. Y.
Cazenovia, Canastota & De Ruyter. (*See U., I. & E.*)
Central and South-Western Railroads (Ga.).
5 g. 1,115 m. 145 lo. 2,008 cars.
W. G. Raoul, *Pres*..................Savannah, Ga.
Wm. Rogers, *Gen. Supt*...........Savannah, Ga.
C. H. Carson, *Pur. Agt*...........Savannah, Ga.
Cen. Div.: D. D. Arden, *M. M*......Savannah, Ga.
T. F. Warwick, *M. M*..........Augusta, Ga.
F. Devine, *M. C. B*..............Savannah, Ga.
So.-West'n Div.: T. D. Kline, *Supt*.....Macon, Ga.
D. M. Gugel, *M. M*....................Macon, Ga.
James A. Knight, *M. C. B*.........Macon, Ga.
Central R. R. of N. J. (*See Phil. & Read.; N. J. Cen. Div.*)
Central R. R. of S. C. (*See Wil. & Wel.*)
Central American & Pacific Ry. 3 g. 67 m. 1 lo. 11 c
W. C. Fitzsimmons, *Gen. Supt*..Escuintla, Guat.
Central Branch Union Pac. (*See Mo. Pac.; (3) Div.*)
Central Iowa Ry. 4-8½ g. 412 m. 50 lo. 2,313 cars.
E. L. Dudley, *Supt*..........Marshalltown, Ia.
J. G. Johnston, *Asst. Supt*....Marshalltown, Ia.
D. D. Phelps, *Asst. Supt*.........Monmouth, Ill.
C. H. Ackert, *Pur. Agt*........Marshalltown, Ia.
John Player, *M. M. & M. C. B.* Marshalltown, Ia.
Central Ontario Ry. 4-8½ g. 33 m. 4 lo. 66 cars.
J. B. McMullen, *Gen. Man*.........Picton, Ont.
James Falconar, *M. M*.............Trenton, Ont.
Central Pac. R. R. 4-8½ g. 4,303 m. 382 lo. 11,260 c.
A. N. Towne, *Gen. Man*....San Francisco, Cal.
J. A. Fillmore, *Gen. Supt*...San Francisco, Cal.
R. H. Pratt, *A. G. Supt*....San Francisco, Cal.
J. R. Watson, *Gen. Pur. Agt*..Sacramento, Cal.
A. J. Stevens, *Gen. M. M*.....Sacramento, Cal.
W. McKenzie, *Asst. G. M. M*..Sacramento, Cal.
Benj. Welch, *Gen. M. C. B*....Sacramento, Cal.
G. J. Turner, *Asst. G. M. C. B.* Sacramento, Cal.
Western: Visalia & Tulare Divs. and Northern Ry.
A. D. Wilder, *Supt*.........W. Oakland, Cal.
G. D. Welch, *M. M.* (W. Div.). W. Oakland, Cal.
W. B. Ludlow, *M. C. B.* (W. Div.) do.
S. Johnson, *M. M.* (T. Div.).......Tulare, Cal.
J. B. Wright, *Supt*..........Sacramento, Cal.
M. W. Cooley, *M. M.* (*S. Div.*)...Rocklin, Cal.
Truckee Div.: J. H. Whited, *Supt.* Wadsworth, Nev.
Geo. Gregg, *M. M*...........Wadsworth, Nev.
Wm. McPherson, *F. Car Sh*..Wadsworth, Nev.
Humb't Div.: G. W. Coddington, *Supt.* Carlin, Nev.
W. F. Smith, *M. M*.................Carlin, Nev.
J. C. Doughty, *For. Car Sh*.......Carlin, Nev.
Salt Lake Div.: A. G. Fell, *Supt*.....Ogden, Utah.
James Lamb, *M. M*...............Terrace, Utah.
A. Sherburne, *For. Car Sh*.....Ogden, Utah.
St. & Cop. R. R.: R. L. Myrick, *Supt*..Stockton, Cal.
Los Angeles; and Yuma Divs. (So. Pac.):
E. E. Hewitt, *Asst. Supt*....Los Angeles, Cal.
James Velsir, *M. M*.........Los Angeles, Cal.
T. T. Gillieland, *For. Car Sh.* Los Angeles, Cal.
Arizona Divs (So. Pac.):
J. A. Muir, *Asst. Supt*...........Tucson, Ariz.
W. F. Smith, *M. M*...............Tucson, Ariz.
Rio Grande (S. Pac.) & El Paso (G. H. & S. A.) Divs.:
C. B. Seymour, *Supt*..............El Paso, Texas.
J. L. Bonner, *M. M*...............El Paso, Texas.
H. C. Standish, *For. Sh*.......El Paso, Texas.
Central Texas & N'w'n R. R. (*See Hous. & Tex. Cen.*)
Central Vermont R. R. 4-8½ g. 864 m. 185 lo. 2,789 c.
J. W. Hobart, *Gen. Man*.........St. Albans, Vt.
J. M. Foss, *Gen. Supt*...........St. Albans, Vt.
W. J. Robertson, *Supt. M. P*....St. Albans, Vt.
No. Div.: I. B. Futvoye, *Supt*.....St. Johns, P. Q.
Rut. Div.: J. Burdett, *Supt*..........Rutland, Vt.
N. L. Davis, *M. M. & C. B*.......Rutland, Vt.
Brattleboro & Whitehall R. R., and
Brat. Div.: E. F. Brooks, *Supt*...Brattleboro, Vt.
New London No'n R. R. 143 m. 22 lo. 303 c.
C. F. Spaulding, *Supt. & P. A.* New London, Ct.
A. J. Robertson, *M. M*.........New London, Ct.
S. O. Banks, *M. C. B*..............New London, Ct.
Chagrin Falls & Southern R. R. 3 g. 6 m. 1 lo. 12 c.
W. Hutchings, *Gen. Man*.....Chagrin Falls, O.
J. W. Williams, *Gen. Supt*....Chagrin Falls, O.
Charleston & Savannah Ry. 5 g. 115 m. 15 lo. 200 c.
H. S. Haines, *Gen. Man*.........Savannah, Ga.
C. S. Gadsden, *Gen. Supt*.....Charleston, S. C.
H. A. Ulmo, *M. M*...............Savannah, Ga
Charlotte, Columbia & Augusta R. R. (*See Rich. & D.*)
Chateaugay R. R. 3 g. 34 m. 8 lo. 380 cars.
A. L. Inman, *Gen. Man*.......Plattsburg, N. Y.
J. M. Davies, *Supt*.......Lyon Mountain, N. Y.
M. L. French, *Asst. Supt*....Plattsburg, N. Y.
Chatham Ry. 4-8½ g. 9 m.
J. B. Snowball, *Man*.............Chatham, N. B.
Chattaroi Ry. 4-8½ g. 51 miles 11 loco. 483 cars.
F. H. Oliphant, *Gen. Man. & P. A.* Ashland, Ky.
J. R. Martin, *M. M*................Ashland, Ky.
Joseph P. Burleigh, *M. C. B*......Ashland, Ky.
Cheraw & Chester R. R. (*See Rich. & Dan.; (2) Div.*)
Cheraw & Darlington R. R. (*See Wil. & Wel.*)
Cheraw & Salisbury R. R. (*See Wil. & Wel.*)
Cherokee R. R. (*See East & West.*)
Cherry Valley R. R. 4-8½ g. 6 m. 3 lo. 6 cars.
E. T. Herndon, *Supt*.................Midland, Mo.
Chesapeake, Ohio & South-Western.
4-9 g. 398 m. 62 lo. 1,345 c.
Jas. L. Frazier, *Supt*...........Louisville, Ky.
H. E. Huntington, *Pur. Agt*.....Louisville, Ky.
J. A. Dew, *Mast. Trans*.........Paducah, Ky.
R. H. Briggs, *Supt. M. P*..........Paducah, Ky.
D. L. Weaver, *M. M*.........Elizabethtown, Ky.
Jno. Fitzgerald, *M. M*...........Paducah, Ky.
Chesapeake & Ohio Ry. 4-8½ g. 642 m. 169 l. 5,120 c.
C. W. Smith, *Gen. Man*..........Richmond, Va.
D. A. Sweet, *Asst. to Gen. Man.* Richmond, Va.
A. S. Emmons, *Pur. Agt*.........Richmond, Va.
T. L. Chapman, *Supt. M. P*......Richmond, Va.
Eastern Div.: A. H. Wood, *Supt*..Richmond, Va.
J. N. King, *M. C. B*..............Richmond, Va.
J. B. Pierce, *M. M*...............Richmond, Va.
Hunt. Div.: W. B. Ryder, *Supt*....Hinton, W. Va.
W. H. Thomas, *M. M*...Huntington, W. Va.
H. C. Bassinger, *M. C. B.* Huntington, W. Va.
Lex. Div.: J. D. Yarrington, *Supt*..Lexington, Ky.
S. R. Tuggle, *M. M*...............Lexington, Ky.
K. C. Div.: G. W. Bender, *Supt*..Covington, Ky.
W. T. Smith, *M. M*...............Covington, Ky.
Cheshire R. R. 4-8½ g. 80 m. 31 lo. 531 cars.
R. Stewart, *Gen. Man*...............Keene, N. H.
H. H. Stone, *Pur. Agt*..............Keene, N. H.
F. A. Perry, *M. M*.................Keene, N. H.
A. E. Howard, *M. C. B*............Keene, N. H.
Chester & Lenoir Ry. (*See Rich. & Dan.; (3) Div.*)
Chicago, Bur. & Kan. City Ry. (*See C. B. & Q.*)
Chicago, Burlington & Quincy R. R.
4-8½ g. 3,608 m. 545 lo. 21,012 cars.
T. J. Potter, *Gen. Man*................Chicago, Ill.
(1) C., B. & Q., East of Mo. Riv.
H. B. Stone, *Asst. Gen. Man*.........Chicago, Ill.
Wm. Irving, *Gen. Pur. Agt*........Chicago, Ill.
G. W. Rhodes, *Supt. M. P*............Aurora, Ill.
Wm. Forsyth, *Mech. Eng*...........Aurora, Ill.
Ill. Divs.: J. D. Besler, *Supt*........Galesburg, Ill.
Chi. Div.: Geo. Alexander, *Supt*.....Aurora, Ill.
L. E. Johnson, *M. M*..................Aurora, Ill.
Galesburg Div.: F. C. Rice, *Supt.* Galesburg, Ill.
Robert Colville, *M. M*.............Galesburg, Ill.
St. L. Div.: W. C. Brown, *Supt*..Beardstown, Ill.
A. Forsyth, *M. M*..................Beardstown, Ill.
Ia. & Mo. Divs.: W. F. Merrill, *Supt.* Burlington, Ia.
East. Div.: O. E. Stewart, *Supt*..Burlington, Ia.
Joel West, *M. M*....................Burlington, Ia.
Mid. Div.: J. B. Maxon, *Supt*.....Ottumwa, Ia.
West'n Div.: J. H. Duggin, *Supt*....Creston, Ia.
C. W. Eckerson, *M. M*..............Creston, Ia.
Chi., B. & Kan C'y and St. L., Keo. & No.-W'n Rys.
Robt. Law, *Gen. Supt*.................Keokuk, Ia.
W. H. Bartlett, *M. M*..............Burlington, Ia.
(2) C. B. & Q., West of Mo. Riv.
G. W. Holdrege, *Asst. Gen. Man.* Omaha, Neb.
C. M. Wead, *Supply Agt*..............Omaha, Neb.
D. Hawksworth, *M. M*.........Plattsmouth, Neb.
C. M. Wead, *Storek'pr*.........Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs.:
T. E. Calvert, *Gen Supt*..............Lincoln, Neb.
D. E. Thompson, *Supt*...............Lincoln, Neb.
E. Bignell, *M. M*.......................Lincoln, Neb.
R. V. Div.: A. Campbell, *Supt*.......McCook, Neb.
A. & N. Div.: J. McConniff, *Supt*...Lincoln, Neb
Chicago, Fairchild & Eau Claire R. R.
4-8½ g. 22 m. 4 lo. 28 cars.
N. C. Foster, *Gen. Man*..............Fairchild, Wis.
C. I. Wickersham, *Pur. Agt*.......Chicago, Ill.
Chicago, Iowa & Dakota Ry. 4-8½ g. 26 m
John Porter, *Gen Man*...............Eldora, Ia.
Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 5,201 m. 626 lo. 19,018 cars.
Roswell Miller, *Gen. Man*....Milwaukee, Wis.
Jos. F. Tucker, *Asst. Gen. M*..Milwaukee, Wis.
J. T. Clark, *Gen. Supt*..........Milwaukee, Wis.
A. J. Earling, *Asst. Gen. Supt.* Milwaukee, Wis.
J. T. Crocker, *Pur. Agt*.........Milwaukee, Wis.
J. M. Lowry, *Gen. M. M*.......Milwaukee, Wis
E. Fairbairn, *M. M*..............Milwaukee, Wis
John Baillie, *Supt. Car Dept*...Milwaukee, Wis
W. E. Kittridge, *M. C. B*.......Milwaukee, Wis
(1) C. & M. and C. & C. B. in Ill.:
G. O. Clinton *Supt*.....................Chicago, Ill.
Ch. & C. B. in Ia.:
R. B. Campbell, *Supt*..............Marion, Wis
La C. & Wis. Val. Divs.:
W. G. Collins, *Supt*...........Milwaukee, Wis
P. du C. & M. Pt. Divs.:
S. J. Collins, *Supt*..............Milwaukee, Wis.
(2) C. H. Prior, *Asst. Gen. Supt*. Minneapolis, Minn.
H. & D. Div.: W. M. Kellie, *Supt.* do.
J. O. Pattie, *M. M*........Minneapolis, Minn.
Ia. & Minn. Div.: H. R. Williams, *Supt.* do.
S. Minn. Div.: F. D. Underwood, *Supt.* Lacrosse, Wis.
Riv. & Dub. Divs.: C. W. Case, *Supt.* Dubuque, Ia.
S. Charnley, *M. M*................Dubuque, Ia.
Ia. & Da. Div.: G. W. Sanborn, *Supt.* Mason City, Ia.
S. Cy. & Da. Div.: W. J. Underwood, *Supt.* Sioux Cy, Ia.
F. H. Moulton, *M. M*...........Yankton, Dak.
J. M. Horan, *For*..................Yankton, Dak.
(3) D. A. Olin, *Asst. Gen. Supt*.........Racine, Wis.
R. & S. W. Divs.: D. L. Bush, *Supt*...Racine, Wis.
John Taylor, *M. M*....................Racine, Wis
(4) Northern Div.: L. B. Rock, *Supt.* Milwaukee, Wis.
Wm. E. Kittredge, *M. C. B*..Milwaukee, Wis
Chicago, Rock Island & Pac. Ry.
4-8½ g. 1,381 m. 309 lo. 8,367 cars.
R. R. Cable, *Pres. & Gen. Man*....Chicago, Ill.
A. Kimball, *V. P. & Gen. Supt*.....Chicago, Ill.
H. F. Royce, *Asst. G. Supt*......Davenport, Ia.
F. A. Marsh, *Pur. Agt*..............Chicago, Ill.
T. B. Twombly, *Gen. M. M*........Chicago, Ill.
B. K. Verbryck, *Gen. M. C. B*......Chicago, Ill.
Ill. Div.: R. H. Chamberlin, *Supt*.....Chicago, Ill.
R. Biester, *M. M*....................Chicago, Ill.
Sam'l Pullman, *M. C. B*............Chicago, Ill.
Ia. Divs.: Jno. Given, *Supt*......Des Moines, Ia.
J. G. Crockett, *M. M*...................Stuart, Ia.
Jas. E. Morrill, *M. M*...........Davenport, Ia.
Chas. M. Leonard, *M. C. B*......Davenport, Ia.
K. & Des. M. Div.: Jno. Given, *Supt.* Des Moines, Ia.
S. W. Wakefield, *M. M*..............Keokuk, Ia.
Henry Kummer, *M. C. B*............Keokuk, Ia.
So.-Wn. Div.: G. F. Walker, *Supt*....Trenton, Mo.
R. O. Carscadin, *M. M*...........Trenton, Mo.
Chas. R. Best, *M. C. B*...........Trenton, Mo.
Chicago, Saginaw & Canada R. R. (*See Det., L. & N.*
Chicago, St. Louis & New Orleans R. R. (*See Ill. Cen.*
Chicago, St. Louis & Pittsburgh R. R.
4-9 g. 635 m. 202 lo. 3,510 cars.
James McCrea, *Manager*..........Columbus, O.
Wm. Mullins, *Gen. Pur. Agt*...Pittsburgh, Pa.
Edward B. Wall, *Supt. M. P*.....Columbus, O.
1, 3 & 5 Divs.: J. F. Miller, *Supt.* Richmond, Ind.
Robert Curtis, *M. M*...............Columbus, O
J. L. Copeland, *G. F. Car Shops* Columbus, O
Wm. Swanston, *M. M*.........Indianapolis, Ind.
W. C. Arp, *Gen. For*..........Indianapolis, Ind.
2 & 4 Divs.: Chas. Watts, *Supt.* Logansport, Ind.
W. W. Reynolds, *M. M*.........Logansport, Ind.
Chas. H. Starr, *G. F. C. Shops,* Logansport, Ind.
Chicago, St. Louis & Wn. R. R. 4-8½ g. 152 m. 11 lo. 1,799 c.
F. E. Hinckley, *Gen. Man*.........Chicago, Ill.
B. T. Lewis, *Pur. Agt*...............Chicago, Ill.
A. H. Crocker *Supt*..................Streator, Ill.
J. N. Chilson, *M. C. B*...............Streator, Ill.
Chicago, St. Paul, Minneapolis & Omaha Ry.
4-8½ g. 1,301 m. 181 lo. 5,459 cars.
J. M. Whitman, *Gen. Supt*......St. Paul, Minn.
W. H. S. Wright, *Pur. Agt*......St. Paul, Minn.
Matt. Ellis, *M. M*....................St. Paul, Minn.
J. J. Ellis, *Asst. M. M*...............St. Paul, Minn.
H. L. Preston, *M. C. B*...............Hudson, Wis.
Ea. & No. Div.: A. A. Hobart, *Supt.* St. Paul, Minn.
St. Paul and Sioux City Div.:
H. Spencer, *Supt*...............St. James, Minn.
H. C. Anderson, *Asst. M. M*....Sioux Cy, Ia.
Neb. Div.: Jas. McCabe, *Supt*......Omaha, Neb.
Chic., Tex. & Mexican Cent. Ry. (*See Gulf, C. & S. F.*)
Chicago & Alton R. R. 4-8½ g. 849 m. 213 lo. 6,168 c.
C. H. Chappell, *Gen. Man*..........Chicago, Ill.
T. M. Bates, *Supt. of Trans*...Bloomington, Ill.
A. V. Hartwell, *Pur. Agt*..........Chicago, Ill.
Wm. Wilson, *Supt. of Mach*..Bloomington, Ill.
Jos. Townsend, *G. For. Car Dept.* do.
Chi. Div.: A. M. Richards, *Supt*..Bloomington, Ill.
St. L. & K. C. Div.: S. D. Reeves, *Supt.* Roodhouse, Ill.
L. H. Miller, *M. M*.....................Slater, Mo.
Chicago & Atlantic Ry. 4-8½ g. 269 m.
F. Broughton, *Gen. Man*............Chicago, Ill.
J. H. Parsons, *Supt*...................Chicago, Ill.
C. J. Domville, *M. M*...........Huntington, Ill.
Chi. & East'n Ill. 4-8½ g. 252 m. 56 lo. 3,870 cars.
O. S. Lyford, *Gen. Supt*.............Chicago, Ill.
D. R. Patterson, *Pur. Agt*...........Chicago, Ill.
P. W. Drew, *M. Trans*................Chicago, Ill.
Allen Cooke, *M. M*...................Danville, Ill.
Chicago & Grand Trunk Ry. (*See Grand Trunk.*)
Chicago & Great Southern Ry.
4-8½ g. 124 m. 4 lo. 122 c.
Geo. C. Kimball, *Gen. Man*.........Attica, Ind.
H. Crawford, Jr., *Supt*...............Chicago, Ill.
Chicago & Iowa R. R. 4-8½ g. 104 m. 18 lo. 237 cars.
T. J. Potter, *Gen. Man*...............Chicago, Ill.
W. H. Holcomb, *Gen. Supt*.........Rochelle, Ill.
H. S. Bryan, *M. M*......................Aurora, Ill.
Chicago & Northwestern Ry.
4-8½ g. 3,761 m. 647 lo. 21,200 cars.
Marvin Hughitt, *2d V. Prs. & G. M.* Chicago, Ill.
C. C. Wheeler, *Gen. Supt*............Chicago, Ill.
R. H. McCullough, *Ass't Gen. Supt.* Chicago, Ill.
R. W. Hamer, *Pur. Agt*...............Chicago, Ill.
Geo. W. Tilton, *Supt. M. P. & M.*; and
Wm. Campbell, *A. Supt. M. P. & M.* Chicago, Ill.
Wis. Div.: Ed. J. Cuyler, *Supt*......Chicago, Ill.
Gal. Div.: Chas. Murray, *Supt*.......Chicago, Ill.
Pen'a Div.: W. F. Fitch, *Supt*.....Escanaba, Mich.
J. Symons, *M. M*....................Escanaba, Mich.
Mad. Div.: C. A. Swineford, *Supt*..Baraboo, Wis.
H. D. Page, *M. M*.....................Baraboo, Wis.
Minn. & Dak. Divs.: S. Sanborn, *Asst. Gen. Supt.*
Wis., St. P. & Dak. Div.:
W. A. Scott, *M. M*...................Winona, Minn.
Dak. Cen. Ry.: J. S. Oliver, *Supt*....Huron, Dak.
Ia. Div.: H. G. Burt, *Supt*...............Boone, Ia.
Geo. W. Lowe, *M. M*...................Clinton, Ia.
No. Ia. Div.: M. Hopkins, *Supt*...Eagle Grove, Ia.
Win. & St. P. Div.:
W. P. Cosgrave, *Supt*..............Winona, Minn.
Chicago & West Michigan:
4-8½ g. 409 m. 47 lo. 1,629 cars.
J. B. Mulliken, *V. P. & G. Man.* Muskegon, Mich.
J. K. V. Agnew, *Gen. Supt.* Grand Rapids, Mich.
Allen Bourne, *Pur. Agt*..............Detroit, Mich.
W. F. N. Davis, *M. M*............Muskegon, Mich.
Chicago & West'n Ind. R. R. 4-8½ g. 50 m. 12 lo. 150 c.
James D. Carson, *Gen. Man*..........Chicago, Ill.
R. W. Johnson, *M. M*....................Chicago, Ill.
Cincinnati, Columbus & Hocking Val. Ry.
4-9 g. 25 m. 2 lo. 77 cars.
D. P. Hyatt, *Gen Man*....................Dayton, O.
Cin., Georgetown & Portsmouth. 3 g. 35 m. 3 lo. 45 c.
M. Simmons, *Supt*.....................Cincinnati, O.
F. Enler, *M. M*..........................Cincinnati, O.
Cincinnati & Green River Ry. 5 g. 17 m. 2 lo. 50 c.
G. B. Harper, *Supt*.....................Yosemite, Ky.
Matt. Horton, *M. M*...................Yosemite, Ky.
Cin., Hamilton & Dayton R. R. 4-9 g. 352 m. 92 l. 2,932 c.
W. F. Stark, *Asst. Supt*...............Cincinnati, O.
John Black, *Gen. M. M*......................Lima, O
W. H. H. Allison, *M. C. B*............Cincinnati, O.
Cincinnati, Hamilton & Indianapolis R. R.
4-8½ g. 98 m
C. J. Hepburn, *Supt*...................Cincinnati, O.
Day. & Mich. Div.:
Cincinnati, Indianapolis, St. Louis & Chicago Ry.
4-8½ g. 384 m. 71 lo. 3,279 cars.
J. W. Sherwood, *Supt*..............Indianapolis, Ind.

BENJAMIN ATHA, Treasurer. **RICHARD VOSE, President.** **D. P. CLARK Supt.**

We make our own Steel for Car Springs.



Spring Manufactory and Steel Works, Newark, N. J.

The Largest Crucible Cast-Steel Works in the Eastern States.

NATIONAL CAR SPRING COMPANY,

MANUFACTURERS OF

Elliptic, Volute-Spiral Hebbard, Oval, Round Bar, Rectangular-Passenger & Freight Car Springs

OFFICE, 13 BARCLAY STREET, NEW YORK.

HOPKINS VERSUS LE ROY!

THE QUESTION.

Does the Le Roy Journal Bearing Company "stand ready" to make what are commonly known as Hopkins Journal Bearings, because of numerous disgusting failures, resulting from the use of the weak, gridiron arrangement known as the Le Roy Bearing heretofore made and sold by them, and the consequent necessity of going out of business or giving their customers a really good bearing even if they have to "pirate" the invention for which a patent was granted to Hopkins that has been declared valid by both the Eastern and Western Railroad Association?

Does the Le Roy Company expect to build up a business by infringing Hopkins' Patent, and selling bearings, and a lawsuit with them?

In the recent interference patent fight between Hopkins and Le Roy, the Commissioner of Patents, in his final decision, which was rendered August 31, 1883, says:

"On the broad claim, as well as the specific claim covering the device embodying not only the broad but the specific invention of a journal bearing with a soft metal lining, with ridges or projections so arranged that, upon being brought in contact with the axle, the ridges or projections will yield and spread out so as to make a perfectly-fitting box, priority of invention must be awarded to Hopkins."

As to the specific arrangement for which priority of invention was awarded to Le Roy, all will perceive that the broad claim for which priority of invention is awarded to Hopkins, and the very broad claim embodied in the patent granted him Oct. 16, 1883, in the following words: "A Journal Bearing made of two different metals, one of soft or yielding nature, and the other of a hard or unyielding nature, the soft or yielding carrying ridges or spurs which receive the initial pressure of the journal, and by the rolling action of the same and the load pressure upon the bearing becomes crushed down and spread in conformity with the contour thereof, as described, whereby the surfaces in wearing contact are adjusted to each other, substantially as specified,"

COVERS THE WHOLE CASE

AN OLD ADAGE SAYS:
"SUE A BEGGAR AND CATCH A LOUSE."

Will Mr. McLean, of the so-called Le Roy Journal Bearing Co., give to Mr. Hopkins and to Railroad Companies and Car-Builders any reliable proof that his Company is in reality anything else than an irresponsible piratical concern (see his advertisement) that is absolutely judgment proof, and any guarantees it may offer against suits by Hopkins are not perfectly worthless, and in so doing will he talk plain, honest common sense, instead of craftily stringing together a lot of words (see his advertisement) that mean nothing unless they mislead?

No invention ever did or can infringe any patent. It is not the invention in any case that infringes, but the making, selling or using of a thing patented without the right to do so. Talk about making an offer to settle a point that does not exist is as cheap as it is misleading and worthless.

As to his being the prior inventor of Bearings with soft metal ridges for receiving the Initial pressure of the Journal, and leaves him absolute master of the situation.

All parties are hereby warned that my rights under said Letters Patent will be enforced.

D. A. HOPKINS, Patentee and Manufacturer,

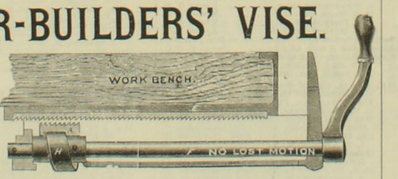
113 Liberty Street, - - - - New York.

MASSEY'S E. & K. PATENT

CAR-BUILDERS' VISE.

Sliding loose jaw up to work and turning handle to right, one third revolution fastens work firmly between the jaws.

Order sample on approval.



T. C. MASSEY, Sole Manufacturer,

11 S. Jefferson Street, Chicago, Ill.

POST & COMPANY'S

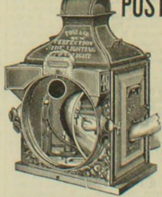
Pat'd Nov. 23, '69; Apr. 29, '73; July 15, '65; June 4, '78; Dec. 12, '82.

NEW PERFECTION

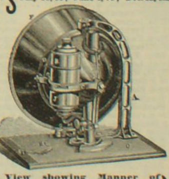
SIDE-LIGHTING

HEAD-LIGHT,

Largest AND **BEST** Head-Light MADE.



The New Reservoir is constructed on our **American Student Lamp principle,** which keeps the oil at a **constant level** until **all is consumed,** thereby saving 2 inches of each **wick,** and it overcomes the **unsteadiness** of the flame, caused by **splashing** of the large body of oil in the reservoirs of ordinary **Head-Lights.** This reservoir can be **readily taken out to be refilled.** Send for Circular of



(View showing Manner of Mounting Reflector, and New Oil Reservoir.)

(View showing Side Signals, Numbers and Nicholson's Pat. Colored Signals, with Reflector turned in position for lighting. No more lanterns required on Engines.)

REVOLVING AND STATIONARY LIGHTS.

POST & CO.,

Patentees and Manufacturers, *CINCINNATI, OHIO.*

CLEVELAND TWIST DRILL CO. 24-26 WEST ST. CLEVELAND, O.

101 CHAMBERS ST. NEW YORK.

MORSE TWIST DRILL AND MACHINE COMPANY

MANUFACTURES

Patent Twist Drills, Machine Bits for Wood, Bit Stock Drills, Reamers, Standard Gauges, Milling Cutters and Special Tools, for use in Railroad, Car and Locomotive Shops. **NEW BEDFORD, Mass.**

Geo. Tozzer, *Pur. Agt*...........Cincinnati, O.
J. S. Patterson, *M. of Mach. & M. C. B.* Cincinnati, O.
Cincinnati, New Orleans & Texas Pacific Ry. Co.
5 g. 846 m. 123 lo. 3,464 cars.
John Scott, *Gen. Man*..........Cincinnati, O.
Richard Carroll, *Gen. Supt*.......Cincinnati, O.
R. W. Healey, *Gen. Pur. Agt*.....Cincinnati, O.
James Meehan, *S. M. P. & M*... Cincinnati, O.
Cin. So. Div.: W. W. Wells, *Supt*..Somerset, Ky.
J. L. Tomlinson, *Asst. S. M. P.*. Ludlow, Ky.
John Richardson, *M. C. B*.... .Cincinnati, O.
A. Thomson, *M. M*... ...Chattanooga, Tenn.
Ala. Gr. S'n Div.: D. McLaren, *Supt.*, and
George Manuell, *M. M*...Chattanooga, Tenn.
J. M. Kelly, *M. C. B*.....Chattanooga, Tenn.
V. & M. Div.: E. F. Raworth, *Supt.* and
M. M.... Vicksburg, Miss.
V. S. & P. Div.: F. Y. Dabney, *Supt*..Monroe, La.
W. Bell Smith, *M. M. & C. B*.....Monroe, La.
New Orleans & North-Eastern R. R.
Edmund L. Tyler, *Supt*.....New Orleans, La.
I. W. Fowle, *M. M*............Meridan, Miss.
Cincinnati Northern Ry.
Geo. L. Barringer, *Gen. Man* ...Cincinnati, O.
Cincinnati, Richmond & Chicago R. R. 4-9 g. 37 m.
C. J. Hepburn, *Supt*. ....Cincinnati, O.
Cincinnati, Selma & Mobile R.R. 5 g. 71 m. 6 lo. 148 c.
A. McCollister, *Supt*...............Selma, Ala.
H. L. Wright, *Pur. Agt*............Selma, Ala.
J. M. Levis, *M. M*... ....Marion, Ala.
Cincinnati, Van Wert & Michigan R. R.
4-9 g. 94 m. 8 lo. 168 cars.
E. Garrison, *Supt*................Van Wert, O.
D. R. Ennis, *Pur. Agt*.... ....Van Wert, O.
H. H. Garr, *M. M. & M. C. B* .....Van Wert, O.
Cin., Wabash & Mich. Ry. 4-8½ g. 165 m. 13 lo. 402 c.
Norman Beckley, *Gen. Man. & P. A.* Elkhart, Ind.
O. W. Lamport, *Supt* ....Wabash, Ind.
S. B. Tinker, *M. M. & M. C. B* ...Wabash, Ind.
Cin., Wash. & Balt. 4-8½ g. 312 m. 65 lo. 1,889 cars
Jas. H. Stewart, *Gen. Man*.......Cincinnati, O.
Edw. Evans, *M. M* ....Chillicothe, O.
T. G. Duncan, *Supt. Car Dept*.......Zaleski, O.
Cincinnati, Wheeling & New York R.R. 4-8½ g. 13 m.
T. M. Atkinson, *Gen. Man*........Batesville, O.
Cincinnati & Eastern Ry. 3 g. 68 m. 6 lo. 133 cars.
4-8½ g. 50 m. 3 lo.
S. Woodward, *Rec* .... Cincinnati, O.
G. H. Wilber, *Gen. Sup. & Pur. Agt*. Cincinnati, O.
A. Donaldson, *M. M*.. ....Newtown, O.
Cincinnati & South-Eastern Ry. 4-8½ g. 18 m.
John V. Patton, *Gen. Man*... .Newport, Ky.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 3 lo. 45 cars.
A. H. Kunst, *Pres. & Gen. Man.* Weston, W. Va.
Sam. A. Steel, *M. M*............Weston, W. Va.
F. Dillie, *M. C. B*....... .. ....Nottingham, O.
Cleveland, Columbus, Cincinnati & Indianapolis & St. Louis Rys. and Dayton & Union R. R.
4-8½ g. 785 m. 246 lo. 7,988 cars.
E. B. Thomas, *Gen. Man*.........Cleveland, O.
J. L. Yale, *Pur. Agt*.......... ....Cleveland, O.
W. F. Turreff, *Gen. M. M*........Cleveland, O.
Col. & Cin. Div.: Robt. Blee, *Supt* .Cleveland, O.
Wm. Garstang, *M. M*..........Cleveland, O.
A. G. Steinbrenner, *G. For. Car Dept.* do.
Ind'p'lis Div.: John O. Ewan, *Supt*. Ind'polis, Ind.
T. W. Ranson, *M. M*. .....Brightwood, Ind.
N. Mark, *G. For. Car Dept*. Brightwood, Ind.
Ind. & St L Ry.: Tho. Burrows, *Supt*. St. Louis, Mo.
T. W. Ranson, *M. M. & C. B.* Brightwood, Ind.
Day. & Un. Rd.: J. H. Barrett, *Supt*...Dayton, O.
H. S. Gordon, *For. M. Shops* ......Dayton, O.
Clevel'd, Delphos & St. Louis R.R. 3 g. 56 m. 3 lo 39 c.
L. H. Burgoon, *Gen. Man*.........Delphos, O.
B. F. Marshall, *M. M*..............Delphos, O.
Cleveland, Indiana & St. Louis R. R.
4-8½ g. 19 m. 2 lo. 20 cars.
J. A. Larned, *Rec. & Supt*......Anderson, Ind.
Cleveland, Mt. Vernon & Delaware R. R.
4-9 g. 144 m. 24 lo. 886 c.
N. Monsarrat, *Gen Supt*.............Akron, O.
G. M. Taylor, *M. M. & C. B.* ...Mt. Vernon, O.
Cleve., Youngstown & Pitts. R. R. 3 g. 30 m. 3 lo 138 c.
D. T. Lumley, *Gen. Supt*.. ....Alliance, O.
C. H. Dorman, *M. M. & M. C. B*....Alliance, O.
Cleveland, Lorain & Wheeling Ry.
4-8½ g. 158 m. 31 lo. 1,878 cars.
Oscar Townsend, *Gen. Man*......Cleveland, O.
Wm. Thornburg, *Supt*... ....Lorain, O.
A. Warburton, *Gen. For*.............Lorain, O.
Cleve. & Marietta R. R. (*See Wheel. & Lake Erie.*)
Cleveland & Pittsburgh. (*See Penna. Co.; (4) Div.*)
Clifton & Port Hudson R. R. 4-8½ g. 22 m. 3 lo. 12 c.
John Bradley, *Supt*....... .New Orleans, La.
W. F. Lockwood, *M. M*.......... ..Clinton, La.
E. D. Anderson, *M. M* ...... Vicksburg, Miss.
Clove Branch R. R. 4-8½ g. 8 m. 1 lo. 61 cars.
C. L. Kimball, *Supt* ..... .Matteawan, N. Y.
W. G. Vanbuskirk, *M. M*...Dutchess Jc., N. Y.
Coburg, Peterborough & Marmora Ry.
5-6 g. 47 m. 5 lo. 255 cars.
Jas. R. Barber, *Gen. Supt*... ....Cobourg, Ont.
Jas. Clark, *M. M*... .... Cobourg, Ont.
John Tinney, *M. C. B*............Cobourg, Ont.
Colorado Central R. R. (*See Un. Pac.; (4) Div.*)
Columbia & Greenville R. R. (*See Rich. & D.; (3) Div.*)
Columbia & Puget Sound R.R. 3 g. 21 m. 7 lo. 114 c.
J. L. Howard, *Gen. Supt*.. San Francisco, Cal.
Columbus, Hocking Valley & Toledo Ry.
4-9 g. 324 m. 90 lo. 7,353 cars.
G. R. Carr, *Gen. Supt*.............Columbus, O.
W. M. Greene, *Pur. Agt*..........Columbus, O.
Ira G. Hutchins, *M. M*....... ....Columbus, O.
J. M. Rockafield, *M. C. B*.... ... .Columbus, O.
Tol. Div.: M. T. Seymour, *Supt*......Columbus, O.
Hock. V. Div.: M. P. L. Booth, *Supt*. Columbus, O.
Ohio Riv. Div.: C. D. Norris, *Supt*.......Logan, O.
Columbus & Eastern R. R. In progress
J. E. Redfield, *Pres*....... ...Columbus, Ohio.
Columbus & Maysville Ry. (*See Cin. & East.*)
Columbus & Rome R. R. 3 g. 33 m. 3 lo. 30 cars.
M. E. Gray, *Supt* ... . .Columbus, Ga.
Columbus & Western Ry. 5 g. 89 m. 6 lo. 53 cars
E. A. Flewellen, *Gen. Man*. ...Columbus, Ga.
R. A. Bridges, *M. M* ....Opelika, Ala.
Concord R. R. 4-8½ g. 141 m. 41 lo. 1,264 cars
H. E. Chamberlin, *Supt. & P. Agt*.. Concord, N. H.
J. T. Gordon, *M. M. & C. B.* .Concord, N. H.
Concord & Claremont R. R. (*See Northern of N. H.*)
Conn. Riv. and Ver. Val. R. Rs. 4-8½ g. 130 m. 42 lo. 554 c.
J. Mulligan, *Supt. & Pur. Agt*. Springfield, Mass.
W. H. Stearns, *M. M. & M. C. B.* Springfield, Mass.
Conn. & Passumpsic Rivers R. R. (*See Passumpsic.*)
Connotton Valley R. R. 3 g. 160 m. 26 lo. 1,036 cars.
Samuel Briggs, *Gen. Man*.... .Cleveland, O.
John Bean, *M. M*.................. .Canton, O.
Cooperstown & Susquehanna Valley R. R.
4-8½ g. 16 m. 2 lo. 14 cars.
Andrew Shaw, *Pres* ....Cooperstown, N. Y.
A. Mumford, *M. M*.........Cooperstown, N. Y.
Corning, Cowanesque & Antrim Ry. (*See Syr., G. & C.*)
Cornwall R. R., 4-8½ g. 12 m. 5 lo. 166 cars
J. M. Havard, *G. Supt. & M. M*....Lebanon, Pa.
Levi Bloneh, *M. C. B* ....Lebanon, Pa.
Cornwall & Lebanon R. R. 4-9 g. 5 m.
J. C. Jennings, *Supt*.......... ...Lebanon, Pa.
Coudersport & Port Allegheny R. R.
3 g. 17 m. 2 lo. 64 cars.
B. A. McClure, *Gen. Supt*.....Coudersport, Pa.
Credit Valley Ry. 4-8½ g. 184 m. 22 lo. 535 cars.
Wm. Whyte, *Gen. Supt*..... .....Toronto, Ont.
John Macnab, *Pur. Agt*..... .....Toronto, Can.
D. Preston, *Mech. Supt*....... ...Toronto, Can.
Crescent Springs Ry. 3 g. 12 m. 2 lo. 50 c.
David Joyce, *Gen. Man*........ ...Lyons, Ga.
W. R. Bourm, *Asst. Gen. Man.* Shell Lake, Wis.
John Devereaux, *Gen. Supt*...Shell Lake, Wis.
C. I. Wickersham, *Pur. Agt*.......Chicago, Ill.
Ira Wood, *Supt. M. P. & M*...Shell Lake, Wis.
John Blackburn, *M. C. B* .....Shell Lake, Wis.
Crooked Creek R. R. 3 g. 9 m. 1 lo. 37 cars.
Walter C. Willison, *Gen. Man.* Webster City, Ia.
Geo. W. Post, *Pur. Agt*............ Lehigh, Ia.
Crown Point Iron Co.'s R. R. 3 g. 13 m. 3 lo. 135 c.
A. L. Inman, *Gen. Man*..... .Plattsburg, N. Y.
H. L. Reed, *Pur. Agt*.......Crown Point, N. Y.
Jas. McMann, *Supt*..........Crown Point, N. Y.
C. W. Sanders, *M. M*....... Crown Point, N. Y.

Cumberland Ry. 4-8½ g. 32 m. 1 lo. 64 c.
J. A. Killam, *Gen. Man*.........Parsboro, N. S.
K. McKinnon, *M. M* ....Parsboro, N. S.
Cumberland Valley R. R. 4-9 g. 127 m. 25 lo. 474 cars.
J. F. Boyd, *Supt*...... .....Chambersburg, Pa.
A. S. Hull, *M. M*......... ..Chambersburg, Pa.
C. Wicke, *M. C. B*...... ...Chambersburg, Pa.
Cumberland & Maurice River R. R. 4-8½ g. 20 m.
L. H. Dowdney, *Supt*........Port Norris, N. J.
Cumberland & Penn. R. R. 4-8½ g. 55 m. 28 lo. 625 c.
P. L. Burwell, *Gen Supt & P. A.* Cumberland, Md.
N. W. Howson, *Mast. of Mach.* Mt. Savage, Md.
Nathan Binix, *M. C. B*..... ...Mt. Savage, Md.

D

Danville & New River R. R. 3 g. 43 m. 2 lo. 30 c.
W. T. Sutherlin, *Gen. Man*.......Danville, Va.
W. T. Whittaker, *M. M*............Danville, Va.
Danbury & Norwalk R. R. 4-8½ g. 36 m. 7 lo. 112 c.
C. M. Crawford, *G. Supt. & P. A.* S. Norwalk, Ct.
W. H. Wilkinson, *M. M. & C. B.* Danbury, Conn.
Danville, Mocksville & So.-Wn. R. R. 3 g. 28 m.
H. M. Shivler, *Supt*...........Leakesville, N. C.
Danville, Olney & O. R. R.R. 4-8½ g. 78 m. 3 lo. 34 c.
C. E. Henderson, *Rec. & Man*.......Olney, Ill.
W. A. Bell, *M. M. & C. B*.. .... ..Kansas, Ill.
Dayton & Toledo R. R. 3 g. 96 m.
C. E. Henderson, *Gen. Man*...... ..Dayton, O.
J. E. Gimperling, *Supt*.............Dayton, O.
Dayton & Union R. R. (*See Clev., Col., Cin. & Ind.*)
Dayton & Michigan R. R. (*See Cin., Ham. & Day.*)
Dayton & Ironton R. R.
C. E. Henderson, *Gen. Man*. Indianapolis, Ind.
H. C. Norton, *Pur. Agt*... .Indianapolis, Ind.
D. F. Jefferson, *Supt. Mach*.......Dayton, O.
Del. Lackawanna & W. and N. Y., Lack. & W. R. Rs.
4-8½ g. 930 m. 436 lo. 31,989 cars.
Wm. F. Halstead, *Gen. Supt*.. ...Scranton, Pa.
G. W. B. Cushing, *Pur. Agt*. ..New York, N. Y.
Walter Dawson, *Mast. of Mach*...Scranton, Pa.
Robt. McKenna, *M. C. B* .. .Scranton, Pa.
Bloomsb'g Div.: C. Graham, *M. M*..Kingston, Pa.
Utica Div.: A. C. Salisbury, *Supt*....Utica, N. Y.
Thos. Thatcher, *M. M*......... ...Utica, N. Y.
Morris & Essex Div.: Sussex; P. & D. and C. R. Rs.
A. Reasoner, *Supt*.... ......Hoboken, N. J.
W. H. Lewis, *M. M*......... Kingsland, N. J.
J. W. Baker, *Mast. Car Rep*. ....Dover, N. J.
Oswego & Syracuse Div.:
W. B. Phelps, *Supt*............Oswego, N. Y.
Jas. Buchanan, *M. M*. .. . Syracuse, N. Y.
Syracuse, Binghamton & New York R. R.
4-8½ g. 81 m. 20 lo. 598 cars.
W. K. Niver, *Gen. Supt*... ...Syracuse, N. Y.
Jas. Buchanan, *M. M*.. ......Syracuse, N. Y.
Cayuga Div.: W. R. Humphrey, *Supt* Ithaca, N. Y.
Buffalo Div.: T. B. Griffith, *M. M*..Buffalo, N. Y.
Delaware, Maryland & Virginia R. R.
4-8½ g. 101 m. 7 lo. 145 cars.
Tho. Groom, *Supt*.... ....Lewes, Del.
Geo. Messick, *M. M*.................Lewes, Del.
W. H. Virden, *M. C. B*..............Lewes, Del.
Delaware River R. R. 4-8½ g. 20 m. 3 lo. 8 cars.
E. H. Green, *Supt*..........Pedricktown, N. J.
Delaware Western R. R. (*See Balt. & Phil.*)
Delaware & Chesapeake R. R. (*See Penna.; (4) Div.*)
Delaware & Hudson Canal Co.
4-3 and 4-8½ g. 634 m. 180 lo. 10,799 cars.
C. F. Young, *Pres & Gen. Man* Honesdale, Pa.
H. G. Young, *Asst. Gen. Man*....Honesdale, Pa.
J. White Sprong, *Pur. Agt*.......Albany, N. Y.
R. C. Blackall, *Supt. of Mach*.... .Albany, N. Y.
Susq. Div.: C. D. Hammond, *Supt*. Albany, N. Y.
Tho. Howard, *M. M*............Oneonta, N. Y.
J. R. Skinner, *M. C. B*. ....Oneonta, N. Y.
Sar. & Ch. Divs.: T. Voorhees, *Supt*...Troy, N. Y.
J. L. Corey, *M. M*... .... . Green Island, N. Y.
Chr. Körner, *M. C. B*.. .. Green Island, N. Y.
Pa. Div.: R. Manville, *Supt & Pur Agt*. and
S. H. Dotterer, *M. M*.... ...Carbondale, Pa.
T. Orchard, *M. C. B*......... Carbondale, Pa.
Denver Circle R. R. 3 g. 12 m. 7 lo. 15 cars
Theo. C. Henry, *Gen. Man*.........Denver, Col.
T. W. Pelham, *Gen. Supt*.........Denver, Col.
Denver, Utah & Pacific R. R. 3 g. 34 m. 4 lo. 171 c.
L. M. Fouts, *Supt*...... ....Denver, Col.
Denver & New Orleans. 4-8½ g. 140 m. 11 lo. 400 c.
C. W. Fisher, *Gen. Man*............Denver, Col.
Chas. Wheeler, *Pur. Agt*.... .....Denver, Col.
J. H. Kirk, *M. M. & M. C. B*. ...Denver, Col.
Denver & Rio Grande Ry. 3 g. 1,317 m. 222 lo. 5,932 c.
W. S. Jackson, *Rec*. ....Denver, Col.
C. M. Hobbs, *Pur. Agt* .. . .Denver, Col.
N. W. Sample, *Supt. M. P. & M* ...Denver, Col.
(1) Col. & N. M. Div.: R. E. Ricker, *G. S.* Denver, Col.
1st Div.: W. W. Borst, *Supt*.......S. Pueblo, Col.
2d Div.: Cole Lydon, *Supt*..... ... Alamosa, Col.
3d Div.: G. W. Cook, *Supt*........Leadville, Col.
4th Div.: R. M. Ridgway, *Supt*.......Salida, Col.
Denver, Rio Grande & Western Ry. 3 g. 369 m.
W. H. Bancroft, *Rec. & Gen. Supt.*,
Salt Lake City, Utah.
A. L. Horner, *Ass't Supt*. Salt Lake City, Utah.
S. C. Smith, *M. M* .. ...Salt Lake City, Utah.
Des Moines, Osceola & Southern R. R.
3 g. 100 m. 7 lo. 253 cars.
B. L. Harding, *Gen. Man*.......Des Moines, Ia.
Henry Stivers, *Supt*.......... ....Osceola, Ia.
L. D. Berry, *M. M*... ....Osceola, Ia.
Elias Tonet, *M. C. B*...............Osceola, Ia.
Des Moines & Ft. Dodge. 4-8½ g. 144 m. 13 lo. 350 c.
C. N. Gilmore, *Supt* ....Des Moines, Ia.
John McGrayel, *M. M*......Grand Junction, Ia.
E. A. Avery, *M. C. B* ....Grand Junction, Ia.
Det., Bay City & Alpena R. R. 3-2 g. 48 m. 5 lo. 227 c.
Milo Eastman, *Supt*..... ... East Tawas, Mich.
Det. Gr. H. & Mil. Ry. (*See Grand Trunk.*)
Det., Lansing & No'n R. R. 4-8½ g. 222 m. 84 lo. 1027 c.
John B. Mulliken, *Gen. Man*......Detroit, Mich.
Allan Bourn, *Pur. Agt*............Detroit, Mich.
Thos. M. Fish, *Gen. Supt*...........Ionia, Mich.
G. C. Watrous, *M. M. & C. B* ......Ionia, Mich.
Det., Mack. & Marq. R.R. 4-8½ g. 152 m. 16 lo. 1,112 c.
D. McCool, *Gen. Supt*... .....Marquette, Mich.
W. J. Tench, *Pur. Agt*........Marquette, Mich.
John B. Wilson, *Mech. Supt*....Marquette, Mich.
Dorchester & Delaware R.R. (*See Penna. (4) Del. Div.*)
Dubuque & Dakota R. R. 4-8½ g. 64 m. 2 lo. 54 cars.
A. C. Goodrich, *Supt*. ....Hampton, Ia.
W. S. Couch, *Pur. Agt*.......... .Dubuque, Ia.
Duck River Valley R. R. (*See Nash., Chat. & St. L.*)
Dunkirk, Allegheny Valley & Pittsburgh R. R.
4-8½ g. 91 m. 14 lo. 102 cars.
D. Thayer, *Gen. Supt*............Dunkirk, N. Y.
R. C. Moore, *Pur. Agt*..... .New York, N. Y.
J. C. Haggett, *M. M. & C. B*.....Dunkirk, N. Y.

E

East Alabama Ry. 5 g. 22 m. 3 lo. 19 cars.
W. W. Barnes, *Supt*...............Opelika, Ala.
East Broad Top R. R. 3 g. 30 m. 7 lo. 260 cars.
A. W. Sims, *Supt* ....Orbisonia, Pa.
A. W. Greenwood, *M. M*.... ....Orbisonia, Pa.
East St. Louis & Carondelet Ry. 4-9 g. 4 lo. 27 c.
Joseph Hill, *Gen. Supt*......East St. Louis, Ill.
East Tenn. & Western North Car. R. R.
3 g. 34 m. 3 lo. 73 cars.
Thomas E. Matson, *Supt*. Elizabethton, Tenn.
East Tennessee, Virginia & Georgia R. R.
5 g. 1,453 m. 166 lo. 3,670 cars.
Henry Fink, *Rec* ....Knoxville, Tenn.
C. H. Hudson, *Gen. Man*......Knoxville, Tenn.
J. F. O'Brien, *Asst. Gen. Man*. Knoxville, Tenn.
J. E. Wilcox, *Pur. Agt*. ......Knoxville, Tenn.
East Tenn. Div. and No. Car. and Ohio Branches.
F. K. Huger, *Supt*...........Knoxville, Tenn.
B. J. Sitton, *M. M*..... ......Knoxville, Tenn.
Jos. Armbruster, *M. C. B*....Knoxville, Tenn.
Alabama Div.: J. M. Bridges, *Supt*...Selma, Ala.
Simon Gay, *M. M* .. ..Selma, Ala.
W. W. Pierce, *M. C. B*. ....Selma, Ala.
Memphis & Charleston R. R. (Div.):
R. B. Pegram, Jr., *Supt*..... Memphis, Tenn.
H. N. Burford, *M. M*.........Memphis, Tenn.
Georgia Div.: J. W. Fry, *Supt*......Atlanta, Ga.
J. E. Mallory, *Ass't Supt*..... ....Macon, Ga.
W. A. Walden, *M. M*...............Atlanta, Ga.
J. H. Perkins, *M. C. B*. ....Atlanta, Ga.
East & West R. R. of Ala. 3 g. 110 m. 9 lo. 85 c.
John Postell, *Manager*.......... Cedartown, Ga.
M. M. & C. B.......Cedartown, Ga.

Eastern R. R. 4-8½ g. 283 m. 110 lo. 2,268 cars.
Payson Tucker, *Gen. Man*........Boston, Mass.
D. W. Sanborn, *Mast. of Trans*..Boston, Mass.
G. F. Hurd, *Pur. Agt*....... . ..Boston, Mass.
Amos Pilsbury, *S. M. P. & M*. ..E. Boston, Mass.
A. M. Waitt, *G. For. Car Dept*.....Salem, Mass.
Con'y Div.: J. W. Sanborn, *Supt.*, Wolfboro J., N. H.
Eastern Kentucky R. R. 4-8½ g. 34 m. 5 lo. 160 c.
H. W. Bates, *Man. & Pur. Agt*... Riverton, Ky.
H. W. Crawford, *M. M*....... ..Hunnewell, Ky.
Eastern (Maine) R. R. (*See Maine Central.*)
Eastern Shore R. R. 4-8½ g. 38 m. 3 lo. 9 c.
W. Thompson, *Supt*.... ....Princess Anne, Md.
F. Strattner, *M. M*......... Princess Anne, Md.
Elberton Air-Line R.R. (*See Rich. & Dan. N. G. Brs.*)
Elizabeth City & Norfolk R. R. (*See Norfolk So.*)
Elizabethtown, Lex. & Big Sandy R.R. (*See Ches. & O.*)
Elmira, Cortland & Northern R. R. 4-8½ g.
A. A. McLeod, *Gen. Man*.........Elmira, N. Y.
Edw. Mahler, *Pur. Agt*.......... Elmira, N. Y.
Thos. Kearsley, *M. M. & M. C. B.* Cortland, N. Y.
Emmitsburg R. R. (*See Western Md.*)
Erie & Huron Ry. 4-8½ g. 40 m.
E. O. Bickford, *Gen Man* ....Toronto, Ont.
Erie & Pittsburg R. R. (*See Penna. Co.; (3) Div.*)
Etowah & Deaton's R. R. 3 g. 9 m.
D. M. Rogers, *Gen. Man*.......... .Etowah, Ga.
Eureka Springs Ry. 4-8½ g. 19 m. 1 lo. 9 cars.
Powell Clayton, *Gen. Man*. Eureka Springs, Ark.
Eureka & Palisade R. R. 3 g. 97 m. 7 lo. 125 cars.
B. Gilman, *Gen. Supt & Pur. Agt*.. Eureka, Nev.
J. M. Crawford, *M. M*.............Palisade, Nev.
A. S. Longley, *M. C. B*...... ...Palisade, Nev.
European & North American R. R. (*See Maine Cen.*)
Evansville, Rockport & E'n Ry. 4-9 g. 71 m. 5 lo. 98 c.
H. L. Shepard, *Supt*............Evansville, Ind.
Evansv. & Terre Haute. 4-8½ g. 169 m. 26 lo. 973 c.
D. J. Mackey, *Gen. Supt*...... Evansville, Ind.
John Torrance, *M. M*.... ......Evansville, Ind.

F

Fitchburg R. R., 4-8½ g. 152 m. 100 lo. 3,566 cars.
John Adams, *Gen. Supt*...........Boston, Mass.
F. S. Pratt, *Pur. Agt* ....Boston, Mass.
Orlando Stewart, *Supt. M. P*......Boston, Mass.
W. A. Foster, *Asst. Supt. M. P*..Fitchburg, Mass.
J. W. Marden, *M. C. B* ... Charlestown, Mass.
Flint & Pere Marq. 4-8½ g. 346 m. 78 lo. 2,664 cars
H. C. Potter, *Gen. Man*..... E. Saginaw, Mich.
D. Edwards, *Asst. Gen. Man*..E. Saginaw, Mich.
G. G. Cook, *Pur. Agt*.........E. Saginaw, Mich.
Sanford Keeler, *Gen. Supt*..E. Saginaw, Mich.
W. F. Potter, *Supt.* (E. Div.)..E. Saginaw, Mich.
M. V. Meredith, *Supt.* (W. Div.) E. Saginaw, Mich.
T. J. Hatswell, *M. M* .... .E. Saginaw, Mich.
H. M. Perry, *M. C. B*..........E. Saginaw, Mich.
Florida Ry. & Nav. Co. 5 g. 488 m. 31 lo. 397 c.
D. E. Maxwell, *Gen. Supt*.... Fernandina, Fla.
R. V. Dohoney, *M. M. & C. B* Fernandina, Fla.
Florida Southern Ry. 3 g. 91 m. 6 lo. 96 cars.
Sherman Conant, *Gen. Man* .. ...Palatka, Fla.
Jas. D. Hollister, *Supt*............Palatka, Fla.
St. J. & L. Eustis Div.:
W. J. Jarvis, *Supt* .... Ft. Mason, Fla.
Fonda, Johnst'n & Gloversv. 4-8½ g. 26 m. 5 lo. 35 c.
Lawton Caten, *Supt*.. ...... Gloversville, N. Y.
G. V. Putman, *M. M*...... Gloversville, N. Y.
Fond du Lac, Amboy & Peoria. 3 g. 30 m. 2 lo. 35 c.
Alonzo Kinyon, *Supt. & P. A.* Fond du Lac, Wis.
Fort Dodge & Fort Ridley R. R. (*See Minn. & St. L.*)
Franklin & Prov. & Hopkinton. 22 m.
E. T. Logee, *Supt* ....Milford, Mass.
Ft. Madison & No.-West'n Ry. 3 g. 45 m. 4 lo. 121 c.
S. B. Kenrick, *Rec. & Pur. Agt*. Ft. Madison, Ia.
I. L. Lamb, *M. M. & C. B*.... Ft. Madison, Ia.
Ft. Wayne, Cin. & Louisv. 4-8½ g. 128 m. 10 lo. 250 c.
White Water R. R 4-8½ g. 65 m. 5 lo. 170 cars.
W. W. Worthington, *Gen. Supt*...Ft. Wayne, Ind.
T. H. Haberkorn, *M. M*.........Ft. Wayne, Ind.
Wm. Knight, *M. C. B*..........Ft. Wayne, Ind.
Ft. Worth & Denver City Ry. 4-8½ g. 114 m. 8 lo. 443 c.
C. L. Frost, *Gen. Supt* ......Fort Worth, Tex.
Freehold & New York Ry. 4-8½ g. 15 m. 4 lo. 40 c.
J. E. Ralph, *Supt. & Pur. Agt*. Freehold, N. J.
M. C. Mooney, *M. M*.... . .. Freehold, N. J.
C. H. Snedeker, *M. C. B*...... Freehold, N. J.
Fulton County N. G. Ry. 3 g. 61 m. 4 lo. 168 cars.
A. C. Atherton, *Gen. Supt. & P. Agt*. Lewiston, Ill.

G

Gainesville & Dahlonega R. R. 3 g. 15 m.
W. P. Price, *Pres*..............Dahlonega, Ga.
Gainesville, Jefferson & Southern R.R. (*See Cen. of Ga.*)
Gal., Harrisburg & San Antonio Ry. (*See Cen. Pac.*)
Galveston, Houston & Hend. R.R. (*See Mo. Pac. (5) Div.*)
Galveston, Sabine & St. Louis Ry.
4-8½ g. 28 m. 2 lo. 33 cars
Brad. Barner, *Gen. Man*.... ..Longview, Tex.
Chas. H. Jewell, *Gen. Supt*.....Longview, Tex.
Geneva, Ithaca & Sayre R. R. (*See Lehigh Val.*)
George's Creek & Cumberland R. R.
4-9 g. 25 m. 6 lo. 212 cars.
J. A. Millholland, *Gen. Man*. Cumberland, Md.
Georgetown & Lane's R. R. 5 g. 36 m. 2 lo. 52 c.
G. W. Earle, *Gen. Supt*.....Georgetown, S. C.
Georgia R. R. 5 g. 307 m. 42 lo. 1,048 cars.
John W. Green, *Gen. Man*.........Augusta, Ga.
John S. Cook, *M. M*............... Augusta, Ga.
T. M. Preval, *M. C. B*... ...... .Augusta, Ga.
Georgia Pacific Ry. 5 g. 218 m.
I. Y. Sage, *Gen. Supt*........Birmingham, Ala.
S. H. Purcell, *Div. Supt*.......Greenville, Miss.
G. H. Barnum, *Div. Supt*... ..Columbus, Miss.
Gettysburg & Harrisburg R. R. 4-9 g. 21 m.
W. H. Woodward, *Supt*. Pine Grove Furnace, Pa.
Grand Haven R. R. (*See Chic. & W. Mich.*)
Grand Junction Ry. (*See Midland of Can.*)
Grand Rapids, Indiana & Mackinaw. (*See Gr. R. & I.*)
G'd Rap., Newaygo & L. S. R. R. (*See Chic. & W. M.*)
Grand Rapids & Indiana. 4-9 g. 528 m. 56 lo. 2,083 c.
W. O. Hughart, *Gen. Man*. Grand Rapids, Mich.
W. R. Shelby, *Pur. Agt*..., Grand Rapids, Mich.
S. D. Bradley, *M. M*...... Grand Rapids, Mich.
No'n Div.: J. M. Metheany, *Supt*. G'nd Rap., Mich.
So'n Div.: P. S. O'Rourke, *Supt*. Fort Wayne, Ind.
Grand Southern Ry. of New Brunswick.
4-8½ g. 82 m. 5 lo. 54 cars.
J. N. Greene, *Gen. Man* ..... .St. George, N. B.
F. W. Holt, *Supt*.... ...... St. George, N. B.
Thomas Logan, *M. M*...... .St. George, N. B.
Grand Tower & Carbondale. 4-8½ g. 25 m. 6 lo. 357 c.
J. C. Simpson, *Supt*.......... Carbondale, Ill.
Hugh Smith, *M. M*....... ....Murphysboro, Ill.
O. L. Garrison, *Pur. Agt* ...... St. Louis, Mo.
Grand Trunk Ry. 4-8½ g. 2,332 m. 660 lo. 16,330 c.
Joseph Hickson, *Gen. Man*.. ...Montreal, Can.
Wm. Wainright, *Asst. Gen. Man*. Montreal, Can.
Jno. Taylor, *Gen. Storekeeper*...Montreal, Can.
Herbert Wallis, *Mech. Supt*.....Montreal, Can.
Wm. McWood, *Supt. Car Dept*...Montreal, Can.
J. Harkom, *Ass. Mech. Supt*..Richmond, P. Q.
A. H. Smith, *Ass. Mech. Supt*....Toronto, Ont.
R. Boaz, *Asst. Mech. Supt*... ..Stratford, Ont.
F. L. Wanklyn, *Loco. Works*...Montreal, Can.
Gt. West'n Div.: Chas. Stiff, *Supt*. Hamilton, Ont.
E. Baines, *Store Kpr*....... ..London, Ont.
C. K. Domville, *Mech. Supt*.. .Hamilton, Ont.
E. Mavor, *Asst. Mch. Supt* .. Hamilton, Ont.
J. D. McIlwain, *Asst. Car Dept*. London, Ont.
Chi. & Gr. Trunk Ry. 4-8½ g. 339 m. 103 lo. 1,191 c.
W. J. Spicer, *Gen. Man*...... Detroit, Mich.
W. H. Pettibone, *Supt*. ..Battle Creek, Mich.
J. F. Lorimer, *Storekeeper*.....Detroit, Mich.
H. Roberts, *Mech. Supt*....... Detroit, Mich.
Midland of Can. 4-8½ g. 471 m. 44 lo. 1,423 c.
W. B. Ferguson, *Supt* ....Peterboro, Ont.
J. D. Barnet, *Mech. Supt*... Port Hope, Ont.
Det., Gr. H. & Mil. Ry. 4-8½ g. 189 m. 39 lo. 696 c.
W. J. Spicer, *Gen. Man*... ....Detroit, Mich.
John S. Lorimer, *Storekeeper*....Detroit, Mich.
W. J. Morgan, *Supt*... ....Detroit, Mich.
H. Roberts, *Mech. Supt*......Port Huron, Mich.
Green Bay, Winona & St. Paul R. R.
4-8½ g. 250 m. 19 lo. 623 cars.
Timothy Case, *Gen. Man. & P. A.* Green Bay, Wis.
A. Fenwick, *M. M*........... Ft. Howard, Wis.
Green Cove Spring & Melrose R.R. 3 g. 32 m. 1 lo. 1 c.
S. Ackley, *Pres*.......... Philadelphia, Pa.
Greenwood, Laurens & Spart'g. 5 g. 4 lo.
J. N. Bass, *Supt* .... .Augusta, Ga.
T. F. Warwick, *M. M. & M. C. B*..Augusta, Ga.

Greenwich & Johnsonville Ry. 4-8½ g. 15 m. 1 lo. 7 c.
J. H. Thompson, *Supt*.... ...Greenwich, N. Y.
Gulf, Col. & Santa Fé Ry. 4-8½ g. 536 m. 51 lo. 1,400 c.
Webster Snyder, *Gen. Man*..Galveston, Texas.
Jno. W. Thorne, *Pur. Agt*....Galveston, Texas.
W. H. Reilly, *M. M. & M. C. B*..Galveston, Texas.
Gulf, W'n Texas & Pac. Ry. 4-8½ g. 68 m. 6 lo. 74 c.
M. D. Monserrate, *Supt. & Pur. Agt*. Cuero, Tex.
James Mooney, *M. M*....... .. Cuero, Texas.

H

Hannibal & St. Jo. R. R. 4-8½ g. 292 m. 76 lo. 1,906 c.
J. F. Barnard, *Gen. Man* ...... .St. Joseph, Mo.
S. E. Cranee, *Gen. Supt* ... .Hannibal, Mo.
Wm. Irving, *Pur. Agt*... .... Chicago, Ill.
N. J. Paradise, *Supt. M. M*... ....Hannibal, Mo.
Chas. Coller, *For. Car Dept*. ....Hannibal, Mo.
Hanover Branch R. R. 4-8½ g. 8 m. 2 lo. 18 cars.
E. Y. Perry, *Supt*........South Hanover, Mass.
Hanover Junction, Hanover & Gettysburg R. R.
4-8½ g. 74 m. 10 lo. 140 cars.
H. D. Scott, *Gen. Supt*.........Gettysburg, Pa.
John J. Bingley, *M. M*.............Hanover, Pa.
Jas. Harthorn, *M. C. B*....... ...Hanover, Pa.
Harrisburg & Potomac R. R. 4-8½ g. 41 m. 3 lo. 45 c.
R. H. Middleton, *Supt*......Boiling Springs, Pa.
Hartford & Conn. Val. R. R. 4-8½ g. 47 m. 9 lo. 196 c.
O. M. Shepard, *Supt*.... ..... New Haven, Ct.
John Henry, Jr., *Supt. M. P.* Hartford, Conn.
Hartford & Conn. W'n R.R. 4-8½ g. 110 m. 16 lo. 495 c.
John F. Jones, *Supt*....... .. . .Hartford, Ct.
J. C. Barton, *M. M*................Hartford, Ct.
Hartwell R. R. (*See Rich. & Dan.; N. G. Brs.*)
Hecla & Torch Lake R. R. 4-1 g. 5 m. 5 lo. 165 cars.
W. A. Childs, *Gen. Man*........Calumet, Mich.
Herkimer, Newport & Poland Ry.
3-6 g. 17 m. 2 lo. 24 cars.
Albert Wilber, *Supt*..........Herkimer, N. Y.
Hobart & Manistee River R. R. 3 g. 9 m. 2 lo. 42 c.
H. W. Marsh, *Supt*. ....Hobart, Mich.
Hot Springs R. R. 3 g. 25 m. 3 lo. 39 cars.
J. N. Conger, *Supt*... ....Hot Springs, Ark.
L. Finlay, *M. M*................. Malvern, Ark.
Housatonic R. R. 4-8½ g. 126 m. 23 lo. 879 cars.
W. H. Yeomans, *Supt*.. ....Bridgeport, Ct.
D. S. Draper, *Pur. Agt*............Bridgeport, Ct.
N. Slingland, *M. M*..... ......Falls Village, Ct.
J. J. Ferris, *M. C. B*....... ...Falls Village, Ct.
Houston Belt Ry. 4-8½ and 3 gauge 16 miles.
S. L. Werden, *V. P. & Gen. Man*. Houston, Tex.
Houston, East & West Tex. Ry. 3 g. 150 m. 10 lo. 570 c.
Paul Bremond, *Pr. & Pur. Agt*..Houston, Tex.
E. L. Bremond, *Gen. Man*........Houston, Tex.
Ed. Campbell, *M. M*........... Houston, Tex.
C. F. Schelewa, *M. C. B*. ..... Houston, Texas.
Houston & Tex. Cen. Ry. 4-8½ g. 750 m. 78 lo. 2,526 c.
J. Waldo, *V. Pr. & Gen. Man*.... Houston, Tex.
A. H. Swanson, *Gen. Tr. Man*......Houston, Tex.
L. C. Noble, *Gen. M. M*...........Houston, Tex.
James McGee, *M. C. B*.. ....Houston, Tex.
So. & Wn. Divs.: M. G. Howe, *Supt*. Houston, Tex.
No. & Ml. Divs.: G. A. Quinlan, *Supt.*, and
C. H. Burns, *Asst. M. M*..... .Corsicana, Tex.
No.-Wn. Div.: Donald Allen, *Supt*.... Waco, Tex.
Humeston & Shenandoah R. R.
4-8½ g. 113 m. 18 lo. 80 cars.
F. O. Wyatt, *Gen. Man*......... ...Clarinda, Ia.
E. C. Murphy, *Supt*........ ... .Clarinda, Ia.
M. B. Snyder, *M. M*. ....Shenandoah, Ia.
Huntingdon & Br. Top Mt. 4-8½ g. 65 m. 18 lo. 318 c.
Geo. F. Gage, *Gen. Man*. .. .Huntingdon, Pa.
Samuel B. Knight, *Pur. Agt*..Philadelphia, Pa.
William Barkla, *M. M*...... ....Saxton, Pa.

I

Illinois Central R. R. 4-8½ g. 1,928 m. 334 lo. 8,565 c.
E. T. Jeffery, *Gen. Supt* ... . .. .Chicago, Ill.
O. Ott, *Pur. Agt*...... ....Chicago, Ill.
Henry Schlacks, *Supt. of Mach*....Chicago, Ill.
W. B. Snow, *M. M. Car Works*.....Chicago, Ill.
(1) Ill. & Ia. Divs.: C. A. Beck, *Supt*.....Chicago, Ill.
Chic. Div.: T. J. Hudson, *Supt* . ... Cairo, Ill.
Wm. Renshaw, *M. M* ....Chicago, Ill.
Mid. Div.: H. L. Frisbie, *Supt*.. .... .Pontiac, Ill.
Spring. Div.: W. Wilkinson, *Supt*. Springfield, Ill.
Wm. Griffin, *M. M* .... .Clinton, Ill.
No'n Div.: J. C. Jacobs, *Supt*.........Amboy, Ill.
J. B. Edams, *M. M*............ ...Amboy, Ill.
Ia. Div.: M. Gilleas, *Supt*.. .... Dubuque, Ia.
Thos. W. Place, *M. M*....... .Waterloo, Ia.
(2) So. Divs.: C. M. Sheafe, *Supt*....New Orleans, La.
La. Div.: J. M. Turner, *Supt*. McComb City, Miss.
W. B. McKenna, *M. M*... McComb City, Miss.
Miss. Div.: J. G. Mann, *Supt*......Jackson, Tenn.
J. F. White, *M. M*....... Water Valley, Miss.
Illinois Midland Ry. 4-8½ g. 176 m. 12 lo. 611 cars.
D. H. Conklin, *Rec. & Gen. Man*......Decatur, Ill.
O. E. Grady, *Train Mast*............Decatur, Ill.
Frank Young, *For. Shops*........... Paris, Ill.
Illinois & St. Louis R. R. 4-8½ g. 19 m. 10 lo. 450 c.
C. H. Sharman, *Gen. Supt. & P. A.* St. Louis, Mo.
D. J. Timlin, *M. M*... ....Belleville, Ill.
Charles Rothe, *M. C. B*..... .. E. St. Louis, Ill.
Indiana, Bloomington & Western Ry.
4-8¾ g. 826 m. 108 lo. 4,018 cars.
C. E. Henderson, *Gen. Man*. Indianapolis, Ind.
I. H. Wilson, *Gen. Supt* .....Indianapolis, Ind.
H. C. Norton, *Pur. Agt*...... Indianapolis, Ind.
Jos. S. Porter, *Div. M. M*........Sandusky, O.
B. Warren, *M. M*. ....Indianapolis, Ind.
M. Fogarty, *Div. M. M* ....Urbana, Ill.
W. B. Warren, *Div. M. M* ... Indianapolis, Ind.
Indiana, Illinois & Iowa R.R. 4-8½ g. 104 m. 5 lo. 83 c.
F. M. Drake, *Pres*........... ... Kankakee, Ill.
T. P. Shonts, *Gen. Supt*..... ... Kankakee, Ill.
R. C. Ackley, *M. M*..............Kankakee, Ill.
Indiana & Illinois Southern Ry. 3 g. 91 m. 3 lo. 69 c.
W. C. Lyon, *Gen. Man. & P. Agt*. Robinson, Ill.
J. S. Pickering, *M. M. & C. B*.. Effingham, Ill.
Indianapolis, Decatur & Springfield Ry.
Geo. Bender, *Supt* ... .Indianapolis, Ind.
H. H. Leeds, *M. M*.... ......Indianapolis, Ind.
Indianapolis & Evansville Ry. 4-8½ g. 54 m.
D. J. Mackey, *Supt* .. .. Evansville, Ind.
Indianapolis & St. Louis R. R. (*See C., C., C. & I.*)
Indianapo. & Vincennes R.R. (*See Penna. Co.; (8) Div.*)
Intercolonial Ry. 4-8½ g. 873 m. 163 lo. 4,589 cars.
David Pottinger, *Chief Supt*.....Moncton, N. B.
T. V. Cook, *Gen. Storekeeper*...Moncton, N. B.
H. A. Whitney, *Mech. Supt*......Moncton, N. B.
Ewd. D. Shaffer, *M. C. B* ....Moncton, N. B.
M. & C. Dist.: J. E. Price, *Supt*. Campbellton, N. B.
Hal. & St. J. Div.: J. J. Wallace, *Supt*. Truro, N. S.
Q. & St. F. Div.: A. R. McDonald, *Supt*. Riv. du Lp, Q.
International Ry. 4-8½ g. 69 m. 7 lo. 12 cars.
D. E. McFee, *Supt* ....Sherbrooke, Que.
J. Ruelle, *M. M*........ ......Sherbrooke, Que.
W. Charest, *M. C. B*...........Sherbrooke, Que.
International & Gt. N'n R. R. (*See Mo. Pac.; (5) Div.*)
Iowa Falls & Sioux City R. R. (*See Ill. Cen.*)
Iron Ry. (*See Tol., Cin. & St. L.*)
Iron Mountain & Helena R. R. (*See Mo. Pac.; (4) Div.*)
Ithaca Auburn & Western Ry. (*See Southern Cen.*)

J

Jacksonville So.-E'n R. R. 4-8½ g. 54 m. 5 lo. 69 c.
E. S. Greenleaf, *Supt*..........Jacksonville, Ill.
Ira F. Petrie, *M. M*............Jacksonville, Ill.
Jacksonville, St. Augustine & Halifax River Ry.
3 g. 76 m. 3 lo. 27 cars.
W. L. Crawford, *Gen. Man*..Jacksonville, Fla.
H. S. Ming, *Supt*. .. ..Jacksonville, Fla.
Jacksonv., Pensacola & Mob. (*See Fla. Cent. & W.*)
Jacksonville, Tampa & Key West Ry. 5 g. 56 m.
G. W. Bentley, *Gen. Man*. ..Jacksonville, Fla.
M. R. Moran, *Supt* .... .Jacksonville, Fla.
F. B. Hurlbut, *M. C. B*..... Jacksonville, Fla.
Jamesville & Washington R. R. (*See Norfolk So'n.*)
Jeffersonv'l, Madison & Indpls. R. R. (*See (9) Pa. Co.*)
Jersey City & Albany R. R. 4-8½ g. 38 m.
J. W. McCulloh, *Manager* ...Jersey City, N. J.
Jersey City & Bergen R. R. 4-10 g. 21 m. 2 lo. 13 c.
T. M. Sayre, *Supt*.... ....Jersey City, N. J.
Jersey Shore, Pine Creek & Buff. Ry. (*See Phil. & R.*)
Junction & Breakwater R.R. (*See Del., Md. & Va.*)

K

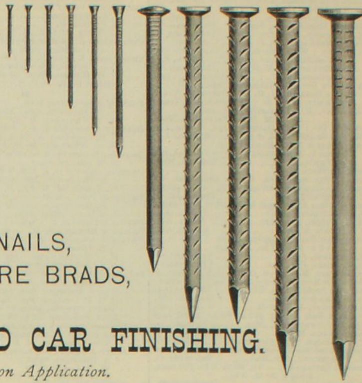
Kaaterskill R. R. 3 g. 8 m.
J. H. Jones, *Supt*..... .... Rondout, N. Y.
Kankakee & Seneca R.R. (*See Cin., Ind., St. L. & Chi.*)
Kansas Central R. R. (*See Union Pacific.*)
Kansas City, Fort Scott & Gulf R. R.
4-8½ g. 389 m. 75 l. 2,037 c.

American Wire Nail Co.,

COVINGTON, KENTUCKY,

MANUFACTURERS EXCLUSIVELY OF

WIRE NAILS.



ESTABLISHED 1875.
INCORPORATED 1876.
J. L. STEPHENS, President.
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FLAT, OVAL, OR DEPRESSED HEAD.
BLUED, BLACK OR BRIGHT.
BARBED STEEL WIRE NAILS,
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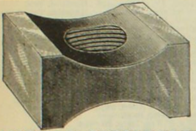
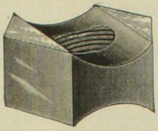


THE

"NEW" NUT,

MANUFACTURED BY



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A positive Lock Nut, requiring no washer or second nut; simple, universally applicable; faces duplicates, precluding mistake in application; applied, removed and used the same as any nut. The direction of the concavities is *across* the fibre of the steel, and the strength of nut equals the initial strength of the bolt. This nut is made of STEEL possessing a tensile strength of 60,000 pounds. It is cold-pressed and is the first **STEEL NUT** offered to the public.

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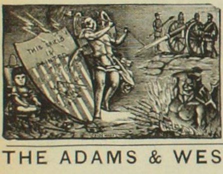

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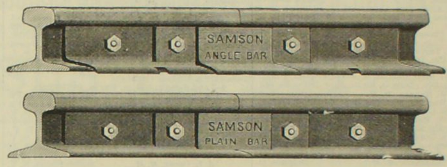

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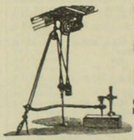

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PORTABLE Drilling, Tapping, Boring and Reaming Machines
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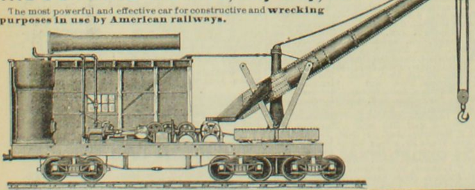

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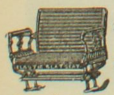

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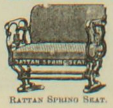

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PATENTED CAR SEATS
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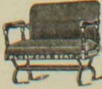
SPRINGS.



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CIRCULARS
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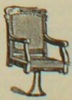

Parlor Car Chair.

Geo. H. Nettleton, *Gen. Man*..Kansas City, Mo.
L. W. Towne, *Supt*..........Kansas City, Mo.
H. P. Jacques, *Pur. Agt*..... Kansas City, Mo.
J. S. McCrum, *M. M*..........Kansas City, Mo.
A. N. Montier, *M. C. B*........Kansas City, Mo.
Kansas Cy, Lawrence & So. Kan. (*See At., Top. & S. F.*)
Kansas City, Springfield & Memphis R. R.
4-8½ g. 283 m. 10 lo. 456 cars.
George H. Nettleton, *Pres*....Kansas City, Mo.
L. W. Towne, *Supt*............Kansas City, Mo.
H. P. Jacques, *Pur. Agt*.......Kansas City, Mo.
J. S. McCrum, *M. M*...........Kansas City, Mo.
A. N. Montier, *M. C. B*........Kansas City, Mo.
Kansas City, St. Joseph & Council Bluffs; and St. Jo. & Des Moines R. Rs. 4-8½ & 3 g. 368 m. 41 lo. 1,148 c.
J. F. Barnard, *Gen. Man*.........St. Joseph, Mo.
J. R. Hardy, *Supt*............St. Joseph, Mo.
D. H. Winton, *Asst. Supt*......St. Joseph, Mo.
A. B. Barnard, *Asst. Supt*....Kansas City, Mo.
Wm. Irving, *Pur. Agt*............Chicago, Ill.
F. A. Chase, *M. M*............St. Joseph, Mo.
Thos. Aylesbury, *F. For. Car. Dep.* St. Joseph, Mo.
Kansas City & Southern Ry. 4-8½ g. In progress.
Wm. Bailey, *Pres*............Kansas City, Mo.
Kansas Coal Belt R. R. 4-8½ g. In progress.
C. H. Malin, *Gen. Man*...........Girard, Kan.
F. A. Hill, *Supt*..................Girard, Kan.
Kansas & Gulf Short Line R. R. 33 m. 2 lo. 32 cars.
Eli Culverhouse, *Gen. Man*..........Tyler, Tex.
V. K. Stevenson, *Pur. Agt*.....New York, N. Y.
Kendall & Eldred R. R. (*See Buf., N. Y. & Phil.*)
Kent Northern Ry. 4-8½ g. 27 m. 2 lo. 16 cars.
J. C. Brown, *Gen. Man*.....Richibucto, N. B.
Kentucky Central R. R. 4-9 g. 255 m. 28 lo. 640 cars.
G. W. Bender, *Supt*..........Covington, Ky.
W. T. Smith, *M. of Mach*.......Covington, Ky.
Kentucky & South Atlantic Ry. 3 g. 23 m. 3 lo. 52 c.
Geo. B. Harper, *Supt. & P. A*..Mt. Sterling, Ky.
Geo. W. Lewis, *M. M*..........Mt. Sterling, Ky.
Keokuk & Des Moines R. R. (*See Chi., R. I. & Pac.*)
Kinzua R. R. (*See Buf., N. Y. & Phil.*)
Kingston & Pembroke Ry. 4-8½ g. 104 m. 9 lo. 214 c.
B. W. Folger, *Supt*..............Kingston, Ont.
J. H. Taylor, *Pur. Agt*..........Kingston, Ont.
J. H. Taylor, *M. M*..............Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 6 lo. 119 cars.
C. A. Coombs, *Supt*....................Bath, Me.
Wm. A. Field, *M. M*..................Bath, Me.
C. L. Turner, *M. C. B*..................Bath, Me.
Knoxville & Augusta R. R. 5 g. 16 m. 2 lo. 34 cars.
R. N. Hood, *Gen. Man. & P. Agt.* Knoxville, Tenn.
J. M. Hood, *Supt*..............Knoxville, Tenn.

L

Lackawanna & Pittsburgh R. R. 3 g. 97 m.
Geo. W. Chapman, *Rec*.........Angelica, N. Y.
Lake Champlain & Moriah R. R. 4-8½ g. 8 m. 8 lo. 222 c.
E. B. Hedding, *Supt*..........Port Henry, N. Y.
Lake Erie & Western Ry. 4-8½ g. 388 m. 53 lo. 1,701 c.
J. H. Cheney, *Gen. Man*..... Bloomington, Ill.
D. S. Hill, *Gen. Supt*..........Bloomington, Ill.
T. H. Perry, *Pur. Agt*..........Bloomington, Ill.
H. L. Cooper, *Supt. of Equipment*....Lima, O.
Lake George & Muskegon River R. R.
4-8½ g. 20 m. 4 lo. 79 cars.
W. S. Gerrish, *Gen. Man*... Muskegon, Mich.
Lake Shore & Michigan So'n Ry.
4-8½ g. 1,340 m. 547 lo. 17,115 cars.
John Newell, *Pres*................ Cleveland, O.
P. P. Wright, *Gen. Supt*..........Cleveland, O.
L. G. Higgins, *Pur. Agt*...........Cleveland, O.
G. W. Stevens, *Supt. M. P*........Cleveland, O.
John Kirby, *Gen. M. C. B*.........Cleveland, O.
East'n Div.: C. B. Couch, *Supt*.....Cleveland, O.
J. S. Graham, *M. M*............ Buffalo, N. Y.
A. C. Robson, *M. C. B*.......... Buffalo, N. Y.
L. O. Gassett, *M. M*............Cleveland, O.
J. Withycombe, *M. C. B*..........Cleveland, O.
Frank. Div.: G. H. McIntire, *Supt.* Youngstown, O.
Toledo Div.: Thos. Flesher, Jr., *Supt.* Cleveland, O.
J. M. Sanborn, *M. M*..............Norwalk, O.
W. O. Smith, *M. C. B*.............Norwalk, O.
Mich. Divs.: J. E. Curtis, *Supt*......... Toledo, O.
Det. Brs.: T. J. Charlesworth, *Supt.* Detroit, Mich.
Lansing, Ypsilanti & Ft. Wayne Branches.
W. H. Caniff, *Supt*............Hillsdale, Mich.
Western Div.: A. G. Amsden, *Supt*...Chicago, Ill.
W. L. Gilmore, *M. M*............Elkhart, Ind.
Frank O. Bray, *M. C. B*.........Adrian, Mich.
Gr. Rap. Br.: M. E. Wattles, *Supt.* Kalamazoo, Mich.
Lake Tahoe R. R. 3 g. 10 m. 3 lo. 49 cars.
D. L. Bliss, *Gen. Man*..............Carson, Nev.
John T. Rogers, *Gen. Supt*...... Carson, Nev.
Tho. Morris, *M. M*................Carson, Nev.
Leavenworth, Topeka & So. W'n Ry. (*See A. T. & S. F.*)
Lebanon Springs R. R. 4-8½ g. 58 m. 5 lo. 44 c.
W. C. Alstyne, *Gen. Man*..........Albany, N. Y.
W. H. Hawkins, *Pur. Agt*.........Albany, N. Y.
Geo. Tefft, *M. M*................Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 495 m. 392 lo. 36,998 c.
H. S. Goodwin, *Gen. Supt*.......Bethlehem, Pa.
W. C. Alderson, *Pur. Agt*.....Philadelphia, Pa.
John I. Kinsey, *M. M*............So. Easton, Pa.
John S. Lentz, *M. C. B*..........Packerton, Pa.
N. J. Div.: Jas. Donnelly, *Supt.* Perth Amboy, N. J.
Coal Rds.: J. I. Blakeslee, *Supt.* Mauch Chunk, Pa.
D. Clark, *M. M*.....................Hazleton, Pa.
John Campbell, *M. M*................Delano, Pa.
B. M. Div.: A. G. Brodhead, *S.*.Mauch Chunk, Pa.
P. Hofecker, *M. M*...............Weatherly, Pa.
Wy. Div.: A. Mitchell, *S. & M. M.* Wilkesbarre, Pa.
Pa. & N. Y.; and Geneva, Ithaca & Sayre R. Rs.
Wm. Stevenson, *Gen. Supt*.........Sayre, Pa.
J. N. Weaver, *M. M*.............. Sayre, Pa.
Jno. S. Lentz, *M. C. B*.......... Packerton, Pa.
Lehigh & Hudson River Ry. 4-8½ g. 63 m. 8 lo. 350 c.
Grinnell Burt, *Gen Man*........Warwick, N. Y.
N. L. Furman, *Supt*............Warwick, N. Y.
John Sayre, *Pur. Agt*..........Warwick, N. Y.
S. Mills, *M. M*...................Warwick, N. Y.
Lehigh & Lackawanna and Lehigh & Susquehanna R. Rs. (*See Phil. & Read.; N. J. Cen. Div.*)
Levis & Kennebec R. R. (*See Quebec Cen.*)
Litchfield, Carrollton & Western R. R. 4-8½ g. 22 m.
H. S. Carroll, *Prest. & G. Man*..Carrollton, Ill.
Ligonier Valley R. R. 4-9 g. 11 m. 2 lo. 22 cars.
Thos. A. Mellon, *Gen. Manager*....Pittsburg, Pa.
Geo. Senft, *Supt. & P. Agt*........Latrobe, Pa.
Little Miami R. R. (*See Penna. Co.'s Rds.; (8) Div.*)
Little Rock, Miss. River & Texas Ry.
4-8½ g. 170 m. 12 lo. 299 cars.
H. Wood, *Gen Man*...........Little Rock, Ark.
F. A. Lister, *Gen. Supt*........Little Rock, Ark.
F. Hufsmith, *M. M. & C. B*..........Argenta, Ark.
Little Rock & Fort Smith. 4-8½ g. 170 m. 13 lo. 360 c.
Hy. Wood, *Gen. Man*...........Little Rock, Ark.
F. A. Lister, *Supt*...............Little Rock, Ark.
F. Hufsmith, *M. M. & M. C. B*.....Argenta, Ark.
Little Saw Mill Run R. R. 3 & 4-8½ g. 8 m. 4 lo. 327 c.
T. Hartley, *Gen. Man*..............Banksville, Pa.
Long Island R. R. 4-8½ g. 352 m. 92 lo. 953 cars.
I. D. Barton, *Gen. Supt.*.Long Island City, N. Y.
Benj. Norton, *Pur. Agt.*.Long Island City, N. Y.
C. A. Thompson, *M. M.* Long Island City, N. Y.
Longview & Sabine Valley R. R. (*See Gal. Sab. & St. L.*)
Louisiana W'n R. R. (*See Cen. Pac.; G., H. & S. A. Div.*)
Louisville, Cin. & Lexington R. R. (*See Louis. & N.*)
Louis., Evans. & St. L. Ry. 4-8½ g. 254 m. 24 lo. 1,032 c.
Geo. F. Evans, *Rec*...............Louisville, Ky.
R. S. Minor, *Gen. Supt*.........Louisville, Ky.
F. P. Boatman, *M. M*..........Evansville, Ind.
Louisville, New Albany & Chicago Ry.
4-8½ g. 479 miles 60 lo. 3,700 cars.
John B. Carson, *Gen. Man*..........Chicago, Ill.
T. L. Dunn, *Gen. Supt*.............Chicago, Ill.
H. O. Nourse, *Pur. Agt*............Chicago, Ill.
Josiah Bettis, *M. M. & C. B*...New Albany, Ind.
C. C. F. Bent, *Supt. Trans*......Lafayette, Ind.
Louisville, New Orleans & Tex. Ry. 455 m. In progress.
Jas M. Edwards, *Gen. Man*...Memphis, Tenn.
E. D. Anderson, *M. M*..........Memphis, Tenn.
John Bradley, *Div. Supt*......New Orleans, La.
C. J. Birdsong, *Div. Supt*......Memphis, Tenn.
Louisville & Nashville R. R.
5 g. 2,186 m. 380 lo. 12,197 cars.
Reuben Wells, *Gen. Man*........Louisville, Ky.
Geo. F. Evans, *Supt*............Louisville, Ky.
P. P. Huston, *Pur. Agt*..........Louisville, Ky.
Harvey Middleton, *Supt. Mach*..Louisville, Ky.
Louisv., Cin. & Lex. Divs.:
J. G. Metcalf, *Supt. Trans*......Louisville, Ky.
P. Leeds, *M. M*....................Louisville, Ky.
J. W. Luttrell, *M. M*.............Louisville, Ky.
J. G. Clifford, *M. M.* (2d & C. Div.). Bowling Grn. Ky.
Henderson Div.: J. Geddes, *Supt.* Henderson, Ky.
W. P. Pike, *M. M*..................Nashville, Tenn.
Nash. & D. Div.: J. Geddes, *Supt.* Nashville, Tenn.
Elkton & Guthrie:
J. Geddes, *Supt*.................. Nashville, Tenn.
S. & N. A. Div.: Levi Hedge, *Supt.* Birmingham, Ala.
C. W. White, *M. M*...........Birmingham, Ala.
Mob. & M.; N. Div. Pens. & Sel.; Sl. & Mont. R. Rs.:
B. C. Epperson, *Supt*.......Montgomery, Ala.
J. N. Hall, *M. M.* (Mont. Shops). Montgomery, Ala.
N. O. Div.: O. M. Dunn, *Supt*...New Orleans, La.
Wm. Adair, *M. M*......................Mobile, Ala.
Memp. Div.: W. Colcamp, *Supt.* Memphis, Tenn.
J. V. Slusser, *M. M*..............Memphis, Tenn.
St. L. Div.: C. O. Parker, *Supt.* Montgomery, Ala.
Thos. Walsh, *M. M*...........Mt. Vernon, Ill.
Pensacola and So. Div. Pens. & Selma and P. & A. Rds.:
E. O. Saltmarsh, *Supt*..........Pensacola, Fla.
W. D. Robb, *M. M*................Pensacola, Fla.
Louisville & Wadley R. R. 5 g. 10 m. 1 lo. 5 c.
J. H. Wilkins, *Supt. & Pur. Agt.* Louisville, Ga.

M

Macon & Brunswick R. R.
(*See E. Tenn., Vir. & Ga.; At. & Ga. Divs.*)
Maine Central R. R. 4-8½ g. 525 m. 82 lo. 2,168 c.
Payson Tucker, *Gen. Man*.........Portland, Me.
Amos Pillsbury, *M. M*...........Waterville, Me.
C. H. Kenison, *M. C. B*............Augusta, Me.
Eastern Maine. 3 g. 19 m. 2 lo. 40 c.
L. L. Lincoln, *Supt*.................Portland, Me.
Manchester & Keene R. R. 4-8½ g. 30 m. (*See Concord.*)
Manchester & Lawrence R. R. (*See Concord.*)
Manchester & North Weare R. R. (*See Concord.*)
Manhattan Ry. 4-8½ g. 32 m. 228 lo. 652 pass. c.
Frank K. Hain, *Gen. Man*.....New York, N. Y.
W. T. Goundie, *Supt. Trans*. .New York, N. Y.
T. W. Peeples, *M. M*..........New York, N. Y.
H. A. Webster, *M. C. B*........New York, N. Y.
Manhattan, Alma & Burlingame Ry. (*See A., T. & S. F.*)
Manitoba Southwestern Colonization Ry.
4-8½ g. 52 m. 3 lo. 125 cars.
J. M. Eagan, *V. Pres*...........Winnipeg, Man.
W. T. Reed, *M. M*..............Winnipeg, Man.
Marietta & Cincinnati R. R. (*See Cin. Wash. & Balt.*)
Marietta & North Georgia R. R. 3 g. 70 m. 4 lo. 45 c.
J. B. Glover, *Supt*.................Marietta, Ga.
W. R. Power, *Pur. Agt*............Marietta, Ga.
C. Chester, *M. M*..................Marietta, Ga.
Marquette, Houghton & Ontonagon R. R.
4-8½ g. 100 m. 42 lo. 2,530 cars.
John Hornby, *Gen. Man*.......Marquette, Mich.
W. A. Thompson, *Ass't Supt.* Marquette, Mich.
M. B. McGee, *Pur. Agt*.......Marquette, Mich.
W. A. Mahan, *M. M*...........Marquette, Mich.
H. D. Lyons, *M. C. B*.........Marquette, Mich.
Maryland Central R. R. 3 g. 27 m. 4 lo. 56 cars.
S. G. Boyd, *Supt*...............Baltimore, Md.
Marquette & Western. 4-8½ g. 25 m. 10 l. 500 c.
D. McCool, *Gen. Supt*........Marquette, Mich.
W. J. Tench, *Pur. Agt*.........Marquette, Mich.
J. B. Wilson, *Mech. Supt*......Marquette, Mich.
Massachusetts Central R. R. 4-8½ g. 48 m. 5 l. 81 c.
E. G. Allen, *Supt. & Pur. Agt*....Boston, Mass.
E. A. Walker, *M. M*.........So. Sudbury, Mass.
McComb, Deshler & Toledo R. R.
(*See Cin., Ham. & Day.; D. & M. Div.*)
Meadville Ry. (*See Penna. Co.'s Rds.; (2) Div.*)
Memphis & Charleston R. R. (*See E. Tenn. Va. & Ga.*)
Memphis & Lit. Rock R. R. 5 g. 135 m. 14 lo. 299 c.
R. Fink, *G. Man. & P. A*.....Little Rock, Ark.
H. G. Fleming, *Supt*...........Memphis, Tenn.
Thos. Rennell, *M. M*.............Argenta, Ark.
T. Rennell, *M. C. B*..............Argenta, Ark.
Mexican Ry. 4-8½ g. 293 m. 42 lo. 616 cars.
E. W. Jackson, *Gen. Man*........Mexico, Mex.
Mexican Central Ry. 4-8½ g. 1,224 m. 94 lo. 2,609 c.
Theo. Nickerson, *Pur. Agt*......Boston, Mass.
D. B. Robinson, *Gen. Man*.......City of Mexico.
D. MacKenzie, *Gen. Supt*......City of Mexico.
F. W. Johnstone, *Supt. M. P. & M.* City of Mexico.
J. H. O'Brien, *M. M*.............City of Mexico.
G. T. Jarvis, *Div Supt*.........City of Mexico.
A. Smith, *Div. Supt*...................Silao, Mex.
Wm. Davis, *Div. Supt*..............Jimulco, Mex.
R. E. Comfort, *Div. Supt*..Paso del Norte, Mex.
R. S. Simpson, *M. M*............City of Mexico.
A. Hendee, *M. M*....................Calera, Mex.
C. F. Stewart, *M. M*..................Silao, Mex.
W. L. Wallace, *M. M*..............Jimulco, Mex.
J. G. McCuen, *M. M*............Chihuahua, Mex.
Tampico Div: E. A. Whorf, *Supt.* Tampico, Mex.
San Blas Div.: C. E. Payne, *Supt*..San Blas, Mex.
Mexican National Ry. 3 g. 766 m. 50 lo. 1,283 c.
Northern General Division:
C. A. Merriam, *Gen. Supt*.......Laredo, Tex.
F. W. Baldwin, *Asst. Gen. Supt*..Laredo, Tex.
John Grace, *M. M*..................Laredo, Tex.
T. Milan, *M. M*...........Corpus Christi, Tex.
Metamoras, Div.:
W. W. Mayberry, *Asst. Supt*..Brownsville, Tex.
Galveston Div.:
T. E. Quinn, *Asst. Supt*.......Galveston, Tex.
Southern General Division:
W. E. Lewis, *Supt*..................Mexico, Mex.
R. C. Peebles, *Asst. Supt*.........Mexico, Mex.
J. M. Winslow, *M. M*.............Mexico, Mex.
Zacatecas Div.:
C. Langrand, *Manager*........Zacatecas, Mex.
Michigan Cen. R. R. 4-8½ g. 1,485 m. 357 lo. 11,284 c.
H. B. Ledyard, *Pres. & Gen. Man.* Detroit, Mich.
E. C. Brown, *Gen. Supt*...........Detroit, Mich.
Robert Miller, *Asst. Gen. Supt*...Detroit, Mich.
Allan Bourn, *Pur. Agt*...........Detroit, Mich.
S. H. Edgerly, *Gen. M. M*.......Jackson, Mich.
(1) Lines West of Detroit River:
E. C. Brown, *Gen. Supt*.......Detroit, Mich.
East. Div.: D. S. Sutherland, *Supt.* Detroit, Mich.
Bay City, Saginaw & Mackinaw Divisions.:
W. A. Vaughan, *Supt*.........Bay City, Mich.
C. E. Smart, *M. M*.............Bay City, Mich.
Main Line: Gr. Rap.; So. Bend; and So. Hav. Divs.:
C. B. Bush, *Supt*...............Jackson, Mich.
W'n Divs.: R. H. L'Hommedieu, *Supt.* Chicago, Ill.
(2) Lines East of Detroit River:
J. B. Morford, *Supt*.........St. Thomas, Ont.
A. F. Bull, *M. M*..............St. Thomas, Ont.
Rob't Potts, *M. C. B*...........St. Thomas, Ont.
Michigan & Ohio.
L. A. Latcha, *Gen. Man*...............Toledo, O.
W. L. Webb, *Pur. Agt*..................Toledo, O.
D. J. Durrell, *M. M*............. Marshall, Mich.
Middleburg & Schoharie; and
Schoharie Valley R. Rs. 4-8½ g. 11 m. 2 lo. 6 cars.
P. S. Danforth, *Gen. Supt*... Middleburg, N. Y.
Midland of Canada. (*See Grand Trunk.*)
Midland No. Carolina Ry. 5 g. 95 m. 9 lo. 82 cars.
Atlantic & North Carolina Ry. 22 m.
John D. Whitford, *Gen. Man*..Newbern, N. C.
J. A. Bryan, *Supt*...............Newbern, N. C.
D. J. Sprague, *Pur. Agt*.......New York, N. Y.
B. Manly, *Supt. of Mach*.........Newbern, N. C.
Milford & Woonsocket.
W. W. Jencks, *Supt*............ Milford, Mass.
Milton & Sutherlin. (*Oper. by Rich. & Danville.*)
Milwaukee, Lake Shore & Western Ry.
4-8½ g. 370 m. 45 lo. 1,536 cars.
H. G. H. Reed, *Gen. Supt*.......Milwaukee, Wis.
J. Donahue, *Supt*...............Milwaukee, Wis.
John Hickey, *M. M*..................Ledyard, Wis.
Milwaukee & Northern and Wisconsin & Michigan R. Rds. 4-8½ g. 228 m. 24 l. 703 cars.
C. F. Dutton, *Gen. Supt*........Milwaukee, Wis.
N. S. Kimball, *M. M*............Ft. Howard, Wis.
Mineral Range R. R. 3 g. 13 m. 4 lo. 43 cars.
Chas. E. Holland, *Pr. & Supt*...Hancock, Mich.
W. H. Carr, *Pur. Agt*..............Hancock, Mich.
T. J. Shellhorn, *M. M. & C. B*..Hancock, Mich.
Minneapolis, Lyndale & Minnetonka Ry.
3 g. 25 miles 4 motors 1 lo. 35 cars.
William McCrory, *Man*.....Minneapolis, Minn.
T. W. Heintzelman, *M. M*. Minneapolis, Minn.
Minneapolis, S. Ste. Marie & Atlantic Ry.
4-8½ g. 45 m.
W. W. Rich, *Supt*..........Minneapolis, Minn.
Minneapolis & St. Louis Ry.
4-8½ g. 560 m. 72 lo. 2,060 c.
W. H. Truesdale, *V. Pres*..Minneapolis, Minn.
T. E. Clarke, *Gen. Supt*....Minneapolis, Minn.
W. B. Palmer, *Pur. Agent.* Minneapolis, Minn.
G. F. Wilson, *M. M. & M. C. B.* Minneapolis, Minn.
Missisquoi R. R. 4-8 g. 28 m.
W. C. Smith, *Man*................St. Albans, Vt.
Mississippi, Terre aux Bœufs & Lake R. R.
29 miles.
M. R. Spelman, *Supt*.........New Orleans, La.
Mississippi & Tenn. R. R. 4-8½ g. 101 m. 12 lo. 194 c.
Jas. M. Edwards, *Gen. Man*....Memphis, Tenn.
J. C. Ramsey, *M. M*...............Memphis, Tenn.
S. J. Bolton, *M. C. B*..............Memphis, Tenn.
Missouri, Kansas & Texas Ry. (*See Mo. Pac.; (2) Div.*)
Missouri Pacific Ry. (Leased and operated lines.)
4-8½ g. 6,029 m. 697 lo. 19,748 cars.
H. M. Hoxie, *3d V. Pres*.........St. Louis, Mo.
R. B. Lyle, *Pur. Agt*..............St. Louis, Mo.
(1), (2) and (3) Divs.:
John Hewitt, *Supt. L. & C. Depts.* St. Louis, Mo.
John Hodge, *Supt. Car Dep*.......St. Louis, Mo.
Frank Howard, *Asst. Supt. C. D.*..Marshall, Tex.
(4), (5) and (6) Divs.:
O. A. Haynes, *Supt. L. & C. Depts.* Marshall, Tex.
(1) Missouri Pacific Ry. 1,028 m. 155 lo. 4,218 cars.
A. M. Hagar, *Supt*....................Sedalia, Mo.
E. Taylor, *M. M*........................Sedalia, Mo.
W'n Div.: A. M. Hagar, *Supt*..........Sedalia, Mo.
(2) Mo., Kan. & Tex. Ry. 1,308 m. 140 lo. 4,248 cars.
S. Irvin, *Asst. Supt. Car Dep*...... Sedalia, Mo.
J. B. Vandyne, *Supt*...............Parsons, Kan.
J. W. Haines, *M. M*................Parsons, Kan.
(3) Central Branch Un. Pac. R. R. 388 m. 30 lo. 599 c.
W. W. Fagan, *Supt*................Atchison, Kan.
H. V. Faries, *M. M*...............Atchison, Kan.
J. W. Blackburn, *A. Supt. Car D.*.Atchison, Kan.
(4) St. L., I. Mt. & So'n Ry. 905 m. 138 lo. 4,928 c.
Wm. Kerrigan, *Supt*...............St. Louis, Mo.
St. Louis Div.: W. H. Harris, *M. M.*.De Soto, Mo.
Ark. Div.: *Supt*.........Little Rock, Ark.
R. M. Richardson, *M. M*.....Little Rock, Ark.
(5) Int. & G. No.: John Herrin, *Supt*..Palestine, Tex.
W. S. Morris, *M. M*...............Palestine, Tex.
(6) Tex. & Pac.: *Supt*.....Marshall, Tex.
E. N. O. & Tr. Cont. Divs.:
Geo. Dimick, *Supt*..................Marshall, Tex.
E. A. Haggerty, *M. M*..............Marshall, Tex.
E. R. Smith, *M. M. & M. C. B*..N. Orleans, La.
Rio Grande Div.:
L. L. Keller, *Supt*...........Big Springs, Tex.
J. K. Lape, *M. M*..............Big Springs, Tex.
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 23 c.
Wm. H. Pratt, *Trustee*..................Mobile, Ala.
Mobile & Girard R. R. 5 g. 84 m. 7 lo. 112 cars.
W. L. Clark, *Gen. Supt*...........Columbus, Ga.
J. C. Albrecht, *M. M*.............Columbus, Ga.
A. J. Nix, *M. C. B*..................Columbus, Ga.
Mobile & Montgomery Ry. (*See Louis. & Nash.*)
Mobile & Northwestern R. R. 3 g. 31 m. 2 lo. 16 c.
Thomas T. A. Lyon, *Pres*.......Glendale, Miss.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,353 cars.
T. M. R. Talcott, *V. Pr. & Gen. Man.* Mobile, Ala.
J. G. Motley, *Gen. Supt*..............Mobile, Ala.
F. Jordan, *Pur. Agt*....................Mobile, Ala.
M. T. Carson, *Gen. M. M*...........Whistler, Ala.
J. T. Booth, *M. C. B*..................Whistler, Ala.
So'n Div.:..................................... Mobile, Ala.
L. J. Morris, *M. M*....................Macon, Miss.
No'n Div.: E. S. Hosford, *Supt*.. Jackson, Tenn.
H. C. Goode, *M. M*...............Jackson, Tenn.
Mobile & Spring Hill R. R. 5-2 g. 8 m. 1 lo. 16 cars.
F. Ingate, *Manager*......................Mobile, Ala.
Moline & Southeastern R. R. 3-6 g. 8 m. 2 lo. 26 c.
R. Battersly, *Gen. Man*.........Coal Valley, Ill.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 8 cars.
G. B. Wiestling, *Supt. & P. A*....Mont Alto, Pa.
Montgomery & Eufaula Ry. (*See Cen. of Ga.*)
Montgomery Southern Ry. 3 g. 20 m. 1 lo. 15 cars.
S. D. Hubbard, Jr., *Gen. Man.* Montgomery, Ala.
Montour R. R. 4-8½ g. 12 m. 2 lo. 130 cars.
C. R. Brown, *Supt. & Pur. Agt*...Imperial, Pa.
Henry Newman, *M. C. B*........Imperial, Pa.
Montpelier & Wells Riv. R. R. 4-8½ g. 38 m. 3 lo. 86 c.
W. A. Stowell, *Supt*.............Montpelier, Vt.
Montreal Portland & Boston Ry. (*See Passumpsic.*)
Montreal & Sorel Ry. 4-8½ g. 47 m. 3 lo. 35 c.
C. N. Armstrong, *G. M. & Pur. Agt.* Sorel, Que.
J. F. Armstrong, *Gen. Supt*..........Sorel, Que.
G. W. Pangborn, *M. M*...............Sorel, Que.
Montrose Ry. 3 g. 28 m. 3 lo. 24 cars.
T. G. Walter, *Gen. Supt*... Tunkhannock, Pa.
Morgan's Louis. & Tex. R. R. 4-8½ g. 260 m. 46 l. 1,339 c.
J. Kruttschnitt, *Supt*.........New Orleans, La.
C. Trumpy, *Pur. Agt*.......... New Orleans, La.
J. D. Connell, *M. M*....................Algiers, La.
Jno. Hildebrand, *M. C. B*............ Algiers, La.
Mount Washington R. R. 5-3 g. 3 m. 6 lo. 6 cars.
Walter Aiken, *Gen. Man*..........Franklin, N. H.
Muncy Creek Ry. (*See Wmspt. & No. Br.*)

N

Nantasket Beach R. R. 4-8½ g. 6 m. 5 lo. 25 c.
George L. Keyes, *Gen. Supt*......Boston, Mass.
Naugatuck R. R. 4-8½ g. 62 m. 17 lo. 547 cars.
Geo. W. Beach, *Supt*..........Waterbury, Conn.
H. A. Bishop, *Pur. Agt*.......Bridgeport, Conn.
H'y D. Beach, *Supt. R. S*....Bridgeport, Conn.
Napanee, Tamworth & Quebec Ry. In progress.
Ed. W. Rathbun, *Gen. Man*....Deseronto, Ont.
R. C. Carter, *Asst. Gen. Man*..Deseronto, Ont.
Narragansett Pier R. R. 4-8½ g. 8 m. 2 lo. 11 c.
G. T. Lanphear, *Supt. & Pur. Agt.* Peacedale, R. I.
Nashua & Rochester R. R. (*See Wor. & Nash.*)
Nashville, Chattanooga & St. Louis Ry.
5 g. 539 miles 87 lo. 1,979 cars.
J. W. Thomas, *G. Man. & P. Agt.* Nashville, Tenn.
M. J. C. Wrenne, *Supt*...........Nashville, Tenn.
James Cullen, *M. M. & C. B*...Nashville, Tenn.
Nashville & Florence R. R. 5 g. 51 m.
J. Geddes, *Supt*..................Columbia, Tenn.
Natchez, Jackson & Col. R. R. 3-6 g. 100 m. 7 lo. 92 c.
E. D. Frost, *Gen. Supt*.......... Natchez, Miss.
National Car Company. 4,000 freight cars.
L. Millis, *Pres*............................Boston, Mass.
F. Stewart Stranahan, *Sec. & Tr.* St. Albans, Vt.
John B. Fletcher, *Supt*..........St. Albans, Vt.
Nebraska, Topeka, Iola & Memphis R. R. 4-8½ g. 16 m.
H. M. Clarke, *Gen. Man*..............Girard, Kan.
C. H. Malin, *Gen. Supt*...............Girard, Kan.
New Brunswick Ry. 4-8½ g. 419 m. 20 lo. 357 cars.
E. R. Burpee, *Gen. Man*.....Woodstock, N. B.
Jesse Mathews, *M. M*...............Gibson, N. B.
T. N. Burpee, *M. C. B*....McAdam Junc., N. B.
J. J. Seely, *Pur. Agt*..........Woodstock, N. B.
Thos. Armstrong, *M. M*.... St. Andrew's, N. B.
G. Houlton, *M. C. B*........St. Andrew's, N. B.
New Brunswick & Can. Ry. (*See New Brun.*)
Newburg, Dutchess & Conn. R. R. 4-8½ g. 58 m.
C. L. Kimball, *Supt. & P. Agt.* Matteawan, N. Y.
New Castle R. R. 3-6 g. 5 m. 2 lo. 76 cars.
Geo. Pearson, *Gen. Man*........New Castle, Pa.
New Castle & Beaver Valley R. R. (*See Penna. Co.*)
New Haven & Derby R. R. 4-8½ g. 13 m. 4 lo. 70 c.
E. S. Quintard, *Supt*...........New Haven, Conn.
J. M. Whitlock, *M. M. & C. B.* New Haven, Conn.
New Haven & No'mpton. 4-8½ g. 170 m. 28 lo. 579 c.
S. B. Opdyke, Jr., *Supt*.........New Haven, Ct.
R. G. Curtis, *Pur. Agt*.......... New Haven, Ct.
Henry Fox, *M. M*...................New Haven, Ct.
John Sweeny, *For Car. Shps*...New Haven, Ct.
New Jersey & New York Ry. 4-8½ g. 37 m. 6 lo. 40 c.
J. D. Hasbrouck, *Gen. Man* Jersey City, N. J.
J. S. Drake, *Supt. & M. M*.........Hillsdale, N. J.
L. B. Van Wagonen, *M. C. B*.....Hillsdale, N. J.
N. J. Southern Ry. (*See Phil. & Read.; N. J. So. Div.*)
New London Northern R. R. (*See Central Ver.*)
New Orleans, B. Rouge, Vicks. & Memphis.
Jas. M. Edwards, *Gen. Man*..New Orleans, La.
John Bradley, *Supt*............New Orleans, La.
New Orleans Pacific Ry. (*See Mo. Pac.; (6) Div.*)
New Orleans & Carrollton R. R.
4-8½ g. 15 m. 12 lo. 79 cars.
C. V. Haile, *Supt*..............New Orleans, La.
John Dahmer, *M. M*...........New Orleans, La.
Jas. Thorn, *M. C. B*...........New Orleans, La.
New Orleans & Mobile R. R. (*See Louis. & Nash.*)
N. O. & Northeastern R. R. (*See Cin., N. O. & Tex. Pac.*)
New Orleans & Selma R. R. 5 g. 21 m. 1 lo. 8 cars.
L. B. Schofield, Supt....................Selma, Ala.
Newport & Wickford R. R. 4-8½ g. 22 m.
Theo. Warren, *Supt*..................Newport, R. I.
Nevada Central R. R. (*See Union Pac.; (7) Div.*)
Nevada County N. G. R. R. 3 g. 23 m. 3 lo. 46 cars.
John F. Kidder, *Supt*........Grass Valley, Cal.
Jas. McCormick, *M. M. & C. B.* Grass Valley, Cal.
Nevada & Oregon R. R. 3 g. 30 m. 25 cars.
D. W. Balch, *Supt*........................Reno, Nev.
N. Y. Central & Hudson River R. R.
4-8½ g. 983 m. 676 lo. 25,161 cars.
J. M. Toucey, *Gen. Supt*...... New York, N. Y.
Chas. Reed, *Pur. Agt*........ New York, N. Y.
Wm. Buchanan, *Supt. M. P. and R. Stock*, New York, N. Y.
N. Y. & Har. Div.: C. M. Bissell, *Supt*. do.
P. McQ. Gibson, *M. M*.........New York, N. Y.
Hud. Riv. Div.: C. M. Bissell, *Supt.* N. York, N. Y.
W. H. Wolfrath, *M. C. B*....New York, N. Y.
E'n Div.: Zenas C. Priest, *Supt.* Little Falls, N. Y.
John Ortton, *M. M*.........West Albany, N. Y.
L. Packard, *M. C. B*.......West Albany, N. Y.
W'n Div.: Geo. H. Burrows, *Supt*...Buffalo, N. Y.
S. L. White, *M. M*................Syracuse, N. Y.
Amos Gould, *M. M*..............E. Buffalo, N. Y.
E. Chamberlain, *M. C. B*... E. Buffalo, N. Y.
Peter Smith, *M. C. B*..... E. Rochester, N. Y.
Ed. Donaby, *M. C. B*....Niagara Falls, N. Y.
N. Y. Chic. & St. L. Ry. 4-8½ g. 524 m. 108 lo. 7,245 c.
Lewis Williams, *Gen. Man*..........Cleveland, O.
Jno. Mackenzie, *Supt. M. P*.......Cleveland, O.
Eas'tn Div.: G. H. Kimball, *Supt*...Cleveland, O.
E. A. Miller, *M. M*...................Conneaut, O.
West'n Div.: A. H. Evans, *Supt*........Chicago, Ill.
W. H. Lewis, *M. M*....................Bellevue, O.
New York City & Northern. 4-8½ g. 58 m. 17 lo. 368 c.
Frank S. Gannon, *Gen. Supt.* High Bridge, N. Y.
Thos. Millen, *M. M*..........High Bridge, N. Y.
New York, Lackawanna & W'n Ry. (*See Del. L. & W.*)
New York, Lake Erie & Western R. R.
S. M. Felton, Jr., *V. Pr*........ New York, N. Y.
(1) N. Y., L. E. & W. Div.: 4-8½ g. 1,073 m. 576 lo. 30,553 c.
B. Thomas, *Gen. Supt*.........Jersey City, N. J.
W. G. Fuller, *Pur. Agt*..........New York, N. Y.
F. M. Wilder, *Supt. M. P. & M*...Susqueh'a, Pa.
E'n Div.: E. O. Hill, *Supt*......Jersey City, N. J.
J. H. Vreeland, *M. M*......Jersey City, N. J.
J. N. Mileham, *M. C. B*.....Jersey City, N. J.
Del. Div.: E. Van Etten, *Supt*..Fort Jervis, N. Y.
J. Van Vechten, *M. M. & C. B.* Pt. Jervis, N. Y.
Susq. Div.: R. B. Cable, *Act. Supt*..Elmira, N. Y.
V. Blackburn, *M. M*...........Susquehanna, Pa.
D. B. Goodell, *M. C. B*...........Elmira, N. Y.
Buf. & R. Divs.: W. J. Murphy, *Supt.*; and
G. B. Ross, *M. M*.....................Buffalo, N. Y.
M. Wilder, *M. C. B*.................Buffalo, N. Y.
B. & S.-W. Div.: C. A. Brunn, *Supt*. do.
W'n Div.: W. B. Coffin, *Supt*..Hornellsville, N. Y.
J. Hawthorne, *M. M*......Hornellsville, N. Y.
N. Y. & Greenwood L. Ry. 4-8½ g. 44 m. 8 lo. 53 c.
Stephen Smith, *Supt*...........Jersey City, N. J.
F. A. Stinard, *M. M*................. Pompton, N. J.
(2) N. Y., Pa. & O. Div.: 4-8½ g. 565 m. 221 lo. 7,794 c.
Chas. Paine, *Gen. Supt*.........Cleveland, Ohio.
J. H. Horway, *Pur. Agt*..........Cleveland, Ohio.
Wm. Fuller, *Supt. M. P*..........Cleveland, O.
S. V. Smith, *Asst. Gen. M. C. B*......Kent, Ohio.
E'n Div.: A. L. Dunbar, *Supt*.......Meadville, Pa.
J. A. Cooper, *M. M*.................Meadville, Pa.
D. S. Dockstader, *M. C. Rep*...Meadville, Pa.
W'n Div.: T. A. Phillips, *Supt*........... Galion, O.
Wm Hill, *M. M*.............................Galion, O.
Geo. Wilson, *For. Car Rep*...... Galion, Ohio.
Maho'g Div.: N. F. Wood, *Supt*..........Cleveland, O.
N. Wright, *M. M*..........................Cleveland, O.
C. N. Thorp, *M. C. Rep*...............Cleveland, O.
New York, New Haven & Hartford R. R.
4-8½ g. 203 m. 123 lo. 2,768 cars.
E. M. Reed, *V. P. & Gen. Supt.* New Haven, Ct.
R. N. Dowd, *Pur. Agt*..............New Haven, Ct.
John Henney, Jr., *Supt. M. P.* .New Haven, Ct.
N. Y. & N. H. Div.: W. H. Stevenson, *Supt*...N. Y.
Shore Line and Air Line Divs.:
O. M. Shepard, *Supt*......... N. Haven, Ct.
Jas. Denver, *M. C. B*..........New Haven, Ct.
Hart. Div.: C. S. Davidson, *Supt*....Hartford, Ct.
O. C. Lackey, *M. M*..................Hartford, Ct.
Jno. Whitmore, *For. C. Dept*...Hartford, Ct.
N. Y., Ontario & Western Ry. (*See N. Y., W. Sh. & Buf.*)
N. Y., Pittsb'h & Chicago. 4-8½ g. 20 m. 2 lo. 32 c.
Geo. W. Dixon, *Supt*............ New Galilee, Pa.
H. P. Hanna, *Pur. Agt*.........Pittsburgh, Pa.
N. Y., Pennsylvania & Ohio R. R. (*See N. Y., L. E. & W.*)
New York, Philadelphia & Norfolk R. R.
4-8½ g. 10 m. 1 lo. 4 cars.
Jas McConkey, *Supt*........Princess Ann, Md.
New York, Providence & Boston R. R.
4-8½ g. 83 m. 29 lo. 430 cars.
J. B. Gardner, *Supt*..............Providence, R. I.
Giles F. Ward, *Pur. Agt*......Stonington, Conn.
Geo. H. Griggs *M. M. & C. B*..Providence, R. I.
N. Y., Susqueh'na & W'n. 4-9 g. 147 m. 33 lo. 1,469 c.
F. A. Potts, *Gen. Man*...........New York, N. Y.
C. D. McKelvey, *Supt*..........Jersey City, N. J.
C. T. Demarest, *Pur. Agt*.....New York, N. Y.
W. C. Ennis, *M. M. & C. B*...Wortendyke, N. J.
New York, Texas & Mexican Ry.
4-8½ g. 92 m. 6 lo. 95 cars.
Allen McCoy, *Gen. Man*............Victoria, Tex.
J. G. Conlon, *M. M*..................Victoria, Tex.
New York, West Shore & Buffalo.
4-8½ g. 850 m. 98 lo. 2,907 c.
J. D. Layng, *Gen. Man*...........New York, N. Y.
C. W. Bradley, *Gen. Supt*.... Weehawken, N. J.
P. S. Bemis, *Pur. Agt*..........New York, N. Y.
R. H. Soule, *Supt. M. P*........Frankfort, N. Y.
T. W. Fredericks, *Asst. S. M. P.* Frankfort, N. Y.
H. R. Div.: *Supt.*, Weehawken, N. J.
Harry Linn, *M. M*..........New Durham, N. J.
Moh'k Div.: H. W. Gardiner, *Supt.* Syracuse, N. Y.
Buff. Div.: D. B. McCoy, *Supt*.....Buffalo, N. Y.
New York, Ontario & Western.
J. E. Childs, *Gen. Supt*.........New York, N. Y.
N. Y. Woodhaven & Rockaway R. R. (*See Long Is.*)
N. Y. & Greenwood Lake Ry. (*See N. Y., L. E. & W.*)
N. Y. & Manhattan Beach Ry. (*See Long Island.*)
New York & Long Branch R. R. (*See Phil. & Read.*)
New York & New England R. R.
4-8½ g. 473 m. 145 lo. 3,959 cars.
W. H. Turner, *Gen. Supt*........ Boston, Mass.
W. W. McKim, *Pur. Agt*.......... Boston, Mass.
J. B. Henney, *Supt. M. P*....... Boston, Mass.
Geo. E. Boyden, *M. M*.........Norwood, Mass.
Elias E. Pratt, *M. C. B*..........Norwood, Mass.
East Div: E. G. Allen, *Supt*.........Boston, Mass.
Nor. Div.: P. St. M. Andrews, *Supt*...Norwich, Ct.
, *M. M*..............Norwich, Ct.
Prov. Div.: L. W. Palmer, *Supt*..Providence, R. I.
Hfd. Div.: E. Holbrook, *Supt*.......Hartford, Ct.
E. M. Humstone, *M. M*...........Hartford, Ct.
West'n Div.: C. H. Platt, *Supt*.....Fishkill, N. Y.
Woons'kt Div.:
E. N. Tucker, *Supt*......... Needham, Mass.
New York & Sea Beach R. R. 4-8½ g. 6 m. 6 lo. 41 c.
W. O. McDowell, *Gen. Man*....New York, N. Y.
C. W. Douglass, *Gen. Supt*...Bay Ridge, N. Y.
Newark, Somerset & Straitsville R. R. (*See B. & O.*)
Newburg, Dutchess & Conn. R. R. 4-8½ g. 59 miles.
C. L. Kimball, *Gen. Supt*.....Matteawan, N. Y.
W. G. Van Buskirk, *M. M. & C. B.*, Dutchess Junction, N. Y.
Newfoundland Ry. 3-6 g. 45 m. 7 lo. 41 c.
C. X. Hobbs, *Gen. Man*..........St. John's N'f'd.
Norfolk Southern R. R. 4-8½ g. 74 m. 7 lo. 182 c.
M. K. King, *Gen. Man. & Pur. Agt.* Norfolk, Va.
J. S. Whitworth, *M. M. & C. B*.....Norfolk, Va.
Norfolk & Ocean View R. R. & Hotel Co.
3 g. 8 m. 2 lo. 9 cars.
W. H. Taylor, *Pres*.....................Norfolk, Va.
Norfolk & Va. Beach R. R. 3 g. 18 m.
J. M. Dickey, *Gen. Man*...........Norfolk, Va.
Norfolk & Western R. R. (*See Shenandoah Val.*)
North-Eastern R. R. of Ga. 5 g. 72 m. 2 lo. 20 cars.
H. R. Bernard, *Supt*..................Athens, Ga.
North-Eastern R. R. (S. C.) (*See Wil. & Wel.*)
North Pacific Coast R. R. 3 g. 84 m. 12 lo. 320 cars.
Gen. Supt..........San Rafael, Cal.
W. F. Russell, *Pur. Agt*.....San Francisco, Cal.
E. L. Reese, *M. M*.....................Saucelito, Cal.
North Shore Ry. 4-8½ g. 209 m. 21 lo. 564 c.
W. Wainwright, *Gen. Man*.....Montreal, Can.

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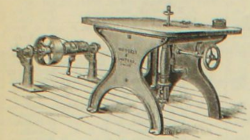
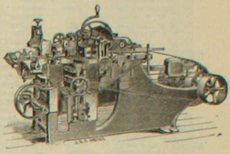
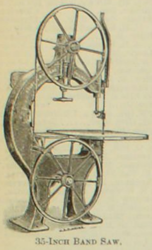


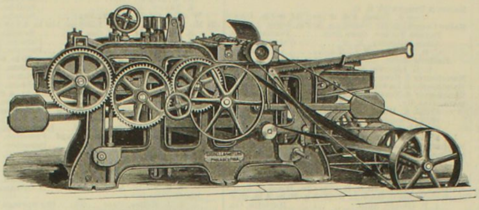
Single Spindle Upright Shaper.



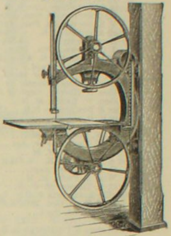
Seven-Inch Four-Sided Molder.



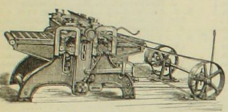
35-Inch Band Saw.



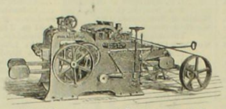
CAR SILL PLANER AND DOUBLE-SURFACER AND JOINTER.



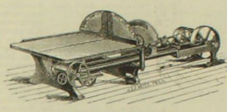
Bracket Band Saw.



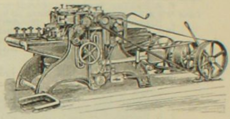
No. 2 Single Surfacer.



"The Philadelphia" Endless Bed D. S.



New Railway Cut-Off Saw.



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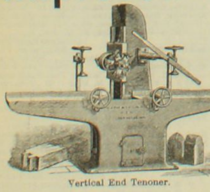

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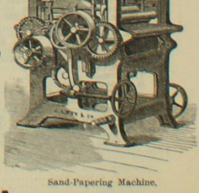

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Northern (N. H.), and Concord & Claremont Rys.
(*See Boston & Lowell.*)
Northern (N. J.) R. R. (*See N. Y., L. E. & W'n.*)
Northern Central Ry. (*See Penna. R. R.* (6) *Div.*)
North'n Pacific R. R. 4-8½ g. 2,207 m. 391 lo. 9,897 c.
T F. Oakes, *Gen. Man*..... .....St. Paul, Minn.
John H. Ames, *Gen. Pur. Agt*..St. Paul, Minn.
Geo. W. Cushing, *Supt. M. P., M. & R. S.* do.
J. C. Barber, *M. C. B*..... .....Brainerd, Minn.
(1) E'n Div.: J. T. Odell, *A. Gen. Man*.St. Paul, Minn.
H. J. Small, *A. S. Mach*. .....Brainerd, Minn.
1st Gr. Div.: M. C. Kimberly, *Supt*.Brainerd, Minn.
M. C. B......Brainerd, Minn.
2d Gr. Div.: J. M. Graham, *Supt*.Jamestown, Dak.
C. C. Quinn, *M. M*............ ... Fargo, Dak.
A. Bardsley, *M. M*..............Mandan, Dak.
F. Greene, *A. Supt*......... ..Mandan, Dak.
3d Gr. Div.: S. R. Ainslie, *Supt*.. Glendive, Mont.
S. L. Bean, *M. M*............Glendive, Mont.
J. C. Munro, *M. M*.... .....Livingston, Mont.
(2) W'n Div.: J. M. Buckley, *Asst. Gen. Man*.
New Tacoma, W. T.
H. D. Sanborn, *P. Agt*..... ...Portland, Ore.
W. T. Small, *A. S. Mach*.......Portland, Ore.
4th Gr. Div.: J. B. Cable, *Supt*...Missoula, Mont.
F. P. Weymouth, *Supt*...... .. Sprague, W. T.
Wm. Garlock, *M. M*.........Missoula, Mont.
J. Evans, *M. M*........ ....Sprague, W. T.
5th Gr. Div.: Otis Sprague, *Supt*...Tacoma, W. T.
H. H. Warner, *M. M*. ....Tacoma, W. T.
Northern & North-W'n Rys. 4-8½ g. 378 m. 50 lo. 1,195 c.
James Webster, *Supt*..... ....Toronto, Can.
W. C. Schreber, *Pur. Agt*.......Allandale, Can.
P. Clarke *M. M*... .... .Toronto Can.
Northern & Western Ry. 4-8½ g. 50 m.
J. B. Snowball, *Man*......... ..Chatham, N. B
Nova Scotia Ry. 4-8½ g. 79 m. 9 lo. 268 c
C. A. Scott, *Gen. Man*.. ...New Glasgow, N. S.
M. F. Punch, *M. M*........New Glasgow, N. S.

O

Ogdensburg & Lake Champlain R. R.
4-8½ g. 130 m. 33 lo. 1,694 cars.
A. A. Gaddis, *Gen. Man*......Ogdensburg, N. Y
E. B. Burnham, *Pur. Agt*...Ogdensburg, N. Y.
Abr. Klohs, *M. M*........... .....Malone, N. Y.
H. S. Leach, *Master Builder*.Ogdensburg, N. Y.
Ohio Central R. R. 4-8½ g. 325 m. 46 lo. 4,760 cars.
John E. Martin, *Rec*...... . Toledo, O
T. M. Peelar, *Supt*............... .Bucyrus, O
F. W. Stewart, *Pur. Agt* .. ..Toledo, O.
J. B. Morgan, *M. M. & C. B*... .....Bucyrus, O.
Ohio River R. R. 4-9 g. (in progress).
C. L. Williams, *Asst. Supt*.Parkersburg, W. Va.
S. Litchworth, *M. M*. .....Parkersburg, W. Va.
Ohio Southern R. R.:
W. H. Van Tassel, *Supt*....... .Springfield, O.
A. J. Sanborn, *M. M* ....Springfield, O.
Ohio & Mississippi Ry. 4-9 g. 616 m. 113 lo. 2,501 cars.
W. W. Peabody, *Pres. & Gen. Man*.Cincinnati, O.
G. E. Atwood, *Pur. Agt*.........Cincinnati, O.
J. H. Setchel, *Gen. M. M*.... .....Cincinnati, O.
Cin. Div.: C. B. Cole, *Supt*..... .....Seymour, Ind.
J. P. Coulter, *Gen. M. C. B*.... ..Aurora, Ind.
E. E. Jenks, *A. Gen. For*......Seymour, Ind.
W. L. Hoffecker, *Ass't M. M*. Vincennes, Ind.
A. N. Bradley, *M. C. P*.........Cochran, Ind
St. L. & Sp. Div.: C. M. Stanton, *Supt*.St. Louis, Mo.
J. W. Stokes, *M. M*. (Spring. Div.)..Pana, Ill.
Louisv. Div.: C. B. Cole, *Supt* . .Louisville, Ky
Oil City & Chicago R. R. (*See Buff., N. Y. & Phil.*)
Old Colony R. R. 4-8½ g. 470 m. 124 lo. 3,527 cars.
J. R. Kendrick, *Gen. Man*.........Boston, Mass.
R. W. Husted, *Pur. Agt*...........Boston, Mass.
Jas. N. Lauder, *Supt. R. S*...... Boston, Mass.
Sam. Stevens, *S. Br. & Bld'gs*....Boston, Mass.
Main Li. Div.: J. H. French, *Supt*...Boston, Mass.
F. M. Twombly, *M. M*......... ..Boston, Mass.
Cape Cod Div.: C. H. Nye, *Supt*..Hyannis, Mass.
F. M. Twombly, *M. M*.............Boston, Mass
No. Div.: S. A. Webber, *Supt*....Fitchburg, Mass.
A. W. Twombly, *M. M*.... ....Taunton, Mass.
Olympia & Chehalis Val. R. R. 3 g. 15 m.
Otis Sprague, *Supt* ....Olympia, W. T.
Oregon Ry. & Navigation Co.
3 & 4-8½ g. 807 m. 72 lo. 1,611 cars.
C. H. Prescott, *V. P. & Gen. Man*.Portland, Ore.
F. T. Dodge, *Supt*. (Riv. Div.)....Portland, Ore.
H. S. Rowe, *Supt*. (Ry Div.)......Portland, Ore.
J. M. Drake, *Pur. Agt*........... Portland, Ore.
Goodall, Perkins & Co., *Supt*. (Ocean Div.)
San Francisco, Cal.
C. C. Hobart, *Gen. M. M*......The Dalles, Ore
P. Carlsen, *M. C. B* .... The Dalles, Ore.
Oregon & California R. R. 4-8½ g. 449 m. 43 lo. 626 c.
R. Koehler, *Man*................Portland, Ore
J. Brandt, *Gen. Supt*.............Portland, Ore.
W. T. Bodley, *Pur. Agt*..........Portland, Ore.
A. Brandt, *M. M*.. ....Portland, Ore.
Ottumwa & Kirkville Ry. 4-8½ g 13 m.
J. A. Kebler, *Supt* ....Ottumwa, Ia.
Owensboro & Nashville R. R. 5 g. 44 m. 3 lo. 70 c.
W. M. Newbold, *Supt*.........Owensboro, Ky.
J. T. Edwards, *M. M. & C. B*. Owensboro, Ky.
Oxford & Henderson R. R. 4-8½ g. 13 m. 2 lo. 11 c.
James A. White, *Gen. Supt*...Henderson, N. C
James E. Lawrence, *M. M* ...Henderson, N. C.

P

Pacific Coast Ry. 3 g. 64 m.
J. M. Fillmore, *Manager*.San Luis Obispo, Cal.
John Walch, *M. M. & C. B*. do.
Painesville & Youngstown Ry. 3 g. 65 m. 7 lo. 319 c.
R. K. Paige, *Rec. & Man*.........Painesville, O.
J. A. Newcome, *Supt. R. S*..... ..Painesville, O.
Panama R. R. 5 g. 48 m. 14 lo. 2,200 cars.
G. A. Burt, *Gen. Supt*..... Aspinwall, U. S. Col.
E. Z. Penfield, *Pur. Agt*.......New York, N. Y.
Jas. Reilly, *M. M*.........Aspinwall, U. S. Col
Passumpsic R. R. 4-8½ g. 147 m. 28 lo. 1,101 cars.
E. Raymond, *Pres. & Pur. Agt*.. Boston, Mass.
H. E. Folsom, *Supt*............Lyndonville, Vt.
L. L. Brigham, *M. M*........ . Lyndonville, Vt.
L. F. Woodard, *M. C. B* ......Lyndonville, Vt.
Paw Paw and Toledo & South Haven R. Rds.
3 g. 20 m. 3 lo. 16 cars.
John Ihling, *Supt*...... ....Lawton, Mich.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
B. B. Newton, *Supt. & Pur. Agt*...Oxford, Pa.
E. H. Williams, *M. C. B*...............York, Pa.
W. P. Kirk, *M. M*...................Oxford, Pa.
Pemigewasset Valley R. R. 4-8½ g. 21 m. 2 lo. 127c.
J. Thomas Vose, *Pres*........ ...Boston, Mass.
Pennsylvania Co.'s (5) Roads.
4-9 g. 3,222 m. 920 lo. 32,809 cars.
Gen. Divs. (1), (2), (3), (4) and (5).
Wm. A. Baldwin, *Gen. Man*.....Pittsburg, Pa.
John Thomas, *Gen. Supt*...... Pittsburg, Pa.
Wm. Mullins, *Gen. Pur. Agt*......Pittsburg, Pa.
Joseph Wood, *Supt. M. P*.... .Fort Wayne, Ind.
(1) Pittsburgh, Ft. Wayne & Chicago Ry.
4-9 g. 468 m. 288 lo. 8,023 cars.
E'n Div.: A. B. Starr, *Supt*.......Allegheny, Pa.
Geo. J. Parkin, *M. M*..... ....Allegheny, Pa.
D. M. Peppard, *M. M*........ . Crestline, O.
W'n Div.: C. D. Law, *Supt*.....Ft. Wayne, Ind.
F. D. Casanave, *M. M*........Ft. Wayne, Ind.
A. H. Somers, *Gen. For. Shops*...Chicago, Ill.
(2) Ashtabula & Pittsburgh, and
(3) Erie & Pittsburg R. Rds. 221 m. 29 lo. 1,362 c.
John M. Kimball, *Supt* Lawrence Junc., Pa.
J. A. Wood, *Gen. For. Shops*........Erie, Pa.
(4) Cleveland & Pittsb'g R. R. 225 m. 97 lo. 3,534 c.
R. F. Smith, *Asst. Man*..........Cleveland, O.
Philip Bruner, *Supt*............Wellsville, O.
W. F. Beardsley, *Mast. of Mach*. Wellsville, O.
5) No-W'n Ohio Ry.: J. S. Morris, *Supt*...Toledo, O.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 3,158 m. 1,459 loco. 66,816 cars.
Chas. E. Pugh, *Gen Man*......Philadelphia, Pa.
Enoch Lewis, *Pur. Agt*.......Philadelphia, Pa.
John Reilly, *Supt. Trans*.....Philadelphia, Pa.
Theo. N. Ely, *Gen S. M. P*.........Altoona, Pa.
Pennsylvania R. R. Divs.
4-9 g. 1,213 m. 705 lo. 46,819 cars.
S. M. Prevost, *Gen Supt*. ... .Altoona, Pa
Frank L. Sheppard, *Supt. M. P*..Altoona, Pa.
G. W. Strattan, *M. M*.. ....Altoona, Pa
Jno. P. Levan, *Gen. Fore*... ....Altoona, Pa.
Phila. Div.: Tho. Gucker, *Supt*.Philadelphia, Pa
H. D. Garrett, *M. M*....W. Philadelphia, Pa.
I. W. Van Houten, *Gen. For*....W. Phila., Pa.
Schuylkill Div.:
Jas. Reed, *Supt*...... ....Reading, Pa.
Mid. Div.: O. E. McClellan, *Supt*. Harrisburg, Pa.
E. L. Caum, *M. M*...........Harrisburg, Pa.
Samuel W. Myers, *Gen. For*. Harrisburg, Pa.
Altoona Div.: J. B. Hutchinson, *Supt*. Altoona, Pa.
Pitts. Div.: Robert Pitcairn, *Supt*..Pittsburgh, Pa.
D. O. Shaver, *M. M*..........Pittsburgh, Pa.
J. G. Stewart, *Gen. For*.......Pittsburgh, Pa.
W. Pa. Div.: A. P. Kirtland, *Supt*. Blairsville, Pa.
Wm. B. Norris, *M. M*..........Blairsville, Pa.
M. H. Falls, *Gen. For*..........Blairsville, Pa
Fred. Div.: Wilson Brown, *Supt*........York, Pa
Tyrone Div.: S. S. Blair, *Supt*........Tyrone, Pa.
Lew. Div.: Wm. M. Phillips, *Supt*. Lewistown, Pa.
Bed. Div.: R. L. Holliday, *Supt*......Bedford, Pa.
Monong. Div.: David M. Watt, *Supt*. Pittsburgh, Pa.
Wm. Lininger, *M. M* ....Ormsby, Pa.
(2) United R. Rs. of N. J. Divs. 471 m. 330 lo. 4,041 c.
F. Wolcott Jackson, *Gen. St*..Jersey City, N. J.
H. S. Hayward, *Supt. M. P*...Jersey City, N. J.
David H. Baker, *Gen. For*...Jersey City, N. J.
N. Y. Div.: Robt. E. Pettit, *Supt*. Jersey City, N. J.
L. A. Bosdevex, *M. M*. ..Jersey City, N. J.
E. F. Bosdevex, *Gen. For*..Jersey City, N. J.
Belv. Div.: J. A. Anderson, *Supt*. Lambertv., N. J.
R. McDowell, *M. M*......Lambertville, N. J.
Amboy Div.: W. N. Bannard, *Supt*. Camden, N. J.
Thos. Kerr, *M. M*....... ....So. Amboy, N. J.
P. S. Bogart, *Gen. For*......So. Amboy, N. J.
(2½) Camden & At. Rd.: 75 m. 18 l. 261 c.
Joseph Crawford, *Supt*...................and
Rufus Hill, *M. M*.. ....Camden, N. J.
Samuel Wills, *M. C. B*..... ..Camden, N. J.
(3) West Jersey R. R. 4-9 g. 188 m. 27 lo. 294 cars.
Joseph Crawford, *Gen. Supt*.....Camden, N. J.
W. McAlister, *M. M*.... ....Camden, N. J.
C. C. Williams, *Gen. For*........Camden, N. J.
(4) Phila., Wilm. & Balt. R. R. 409 m. 128 lo. 1,882 c.
H. F. Kenney, *Gen. Supt*. ....Philadelphia, Pa.
J. M. Wallis, *S. M. P*. ....Philadelphia, Pa.
H. D. Gordon, *M. M*.........Wilmington, Del.
W. H. Lungren, *M. C. B*......Wilmington, Del
Cen. Div.: L. K. Lodge, *Supt*......... Media, Pa.
Del. Div.: I. N. Mills, *Supt*..........Clayton, Del.
Mo. Div.: H. H. Carter, *Supt*..Wilmington, Del.
5) Phila. & Erie R. R. Divs.: 437 m. 110 lo. 3,089 c.
R. Neilson, *Gen. Supt*.... ...Williamsport, Pa.
A. O. Dayton, *Supt. Mo. Po*..Williamsport, Pa.
E'n. Div.: E. B. Westfall, *Supt*. Williamsport, Pa.
Sun. H. & W. Div.: A. Walter, *Supt*.; and
H. K. Stout, *M. M*.... ... .Sunbury, Pa.
Mid. Div.: Tho. A. Roberts, *Supt*.....Renovo, Pa.
Wm. L. Holman, *M. M*..........Renovo, Pa.
West'n Div.: J. W. Reynolds, *Supt*.....Erie, Pa.
J. Gaskill, *M. M*.....................Erie, Pa.
6) Northern Central Ry. 4-9 g. 346 m. 152 lo. 6,610 c.
Robert Neilson, *Gen. Supt*...Williamsport, Pa.
A. O. Dayton, *Supt. M. P*....Williamsport, Pa.
A. W. Sumner, *Pur. Agt*... ....Baltimore, Md.
J. M. Coale, *M. M*...............Baltimore, Md.
G. W. Demarest, *Gen. For*......Baltimore, Md.
Susq. Div.: E. B. Westfall, *Supt*. Williamsport, Pa.
Sham. Div.: A. Walter, *Supt*..... ..Sunbury, Pa.
Elm. & Can. Divs.: S. Meade, *Supt*..Elmira, N. Y.
Jas. Strode, *M. M*.... ....Elmira, N. Y.
J. C. Dyott, *Gen. For* ....Elmira, N. Y.
Sodus Bay Div.: S. Mead, *Supt*. Sodus Point, N. Y.
Baltimore Div.: H. W. Kapp, *Supt*. Baltimore, Md.
(7) Balt. & Pot. & Alex. & Fred. 125 m. 30 lo. 360 c.
H. F. Kenny, *Gen. Supt*.......Philadelphia, Pa.
A. W. Sumner, *Pur. Agt*... ....Baltimore, Md.
J. M. Wallis, *Supt. Mo. Po*....Philadelphia, Pa.
H. D. Gordon, *M. M*....... .Wilmington, Del.
J. Lescallett, *For. Mach. Shop*. Washington, D. C.
R. F. Downs, *For. Car Shop*..Washington, D. C.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 3,271 c.
J. B. Smith, *Gen. Supt*. ..... .Dunmore, Pa
And. Crane, *M. M*. .... Dunmore, Pa.
Geo. W. Simpson, *M. C. B*........Dunmore, Pa.
Pennsylvania, Slatington & New England R. R.
In progress. 4-8½ g. 18 m. 1 lo. 20 cars.
C. H. Stanton, *Supt*.......... New York, N. Y.
Pennsylvania & Erie R. R.—Early Branch.
C. R. Early, *Gen. Supt*.......... Ridgeway, Pa.
Pensacola & Atlantic R. R. 5 g. 161 m. 9 lo. 67 cars.
E. O. Saltmarsh, *Gen. Supt*.... Pensacola, Fla.
W. D. Robb, *M. M*............ .Pensacola, Fla.
Pensacola & Perdido R. R. 5 g. 10 m. 5 lo. 92 cars.
B. F. Simmons, *Pr. & Supt*.... Pensacola, Fla.
H. W. Simmons, *Pur. Agt*......Pensacola, Fla.
J. C. Schutte, *M. M*............ Pensacola, Fla.
People's Ry. 4-8½ g. 15 m. 2 lo. 14 cars.
W. D. Pollard, *Supt*....... ......Pottsville, Pa.
Peoria, Decatur & Evansville Ry.
4-8½ g. 254 m. 30 lo. 1,660 cars.
G. L. Bradbury, *Gen. Man*.... .... Peoria, Ill.
P. Reilly, *M. M*....................Mattoon, Ill.
Peoria & Farmington R. R. (*See Cen. Ia.*)
Peoria & Pekin Union Ry. 4-8½ g. 20 m. 12 lo. 106 c.
Thos. B. Burnett, *Gen. Supt. & P. A*. Peoria, Ill.
O. W. Bell, *Supt* ....Peoria, Ill.
R. F. Hurd, *M. M. & C. B*.. ....Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 39 miles.
D. B. Clack, *Supt*......Perkiomen Junction, Pa.
H. Boyd, *Pur. Agt*............Norristown, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 133 cars.
R. M. Sully, *Supt*....... ......Petersburg, Va.
Geo. F. Jones, *Pur. Agt*.... ...Petersburg, Va.
J. R. Woodard, *M. M*..... .....Petersburg, Va.
Phila., Wilmington & Balt. R. R. (*See Penna. R. R.*)
Peterborough & Hillsborough. (*See Northern, N. H.*)
Philadelphia, Newtown & N. Y. R. R. 4-8½ g. 23 m.
W. M. Geary, *Supt*............Philadelphia, Pa.
Phila. & Atlantic City R. R. 4-8½ g. 54 m.
John E. Wootten, *Gen. Man*. Philadelphia, Pa.
W. Bertolet, *Supt*......... ...Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*.......Philadelphia, Pa.
Philadelphia & Erie R. R. (*See Penna. R. R.*; (5) *Div.*)
Philadelphia & Reading R. R.
4-8½ g. 1,588 m. 940 lo. 57,477 cars.
John E. Wootten, *Gen. Man*..Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*......Philadelphia, Pa.
Geo. Eltz, *Supt. Trans*.. .... Reading, Pa.
L. B. Paxson, *Eng. of Mach*...... Reading, Pa.
No. Penn. & Bound Brook Div.:
I. A. Sweigard, *Supt*........Philadelphia, Pa.
Mahanoy & Susquehanna Div.:
J. H. Olhausen, *Supt*..........Palo Alto, Pa.
D. C. Reinhart, *Asst. Supt*. ...Catawissa, Pa.
A. A. Hesser, *Asst. Supt* Mahanoy Plane, Pa.
Schuylkill & Susquehanna Br.:
H. W. Tracy, *Supt* ... .Pine Grove, Pa.
Reading & Columbia R. R.:
A. M. Wilson, *Supt* ....Columbia, Pa.
N. J. Central and N. J. Southern Divs.:
W. W. Stearns, *Supt*........ Elizabeth, N. J.
Lehigh & Susquehanna Div.:
G. W. Twining, *Supt* .. Mauch Chunk, Pa.
Pittsburgh, Bradford & Buffalo Ry. (*See Pitts. & West.*)
Pittsburgh, Chartiers & Youghiogheny R. R.
4-8¾ g. 19 m.
Geo. S. Griscom, *Gen. Man*.....Pittsburgh, Pa.
Pittsburgh, Cincinnati & St. Louis Ry. (5 Gen. Divs.)
4-9 g. 916 m. 239 lo. 7,133 cars.
James McCrea, *Manager*.........Columbus, O.
Wm. Mullins, *Pur. Agt*... ...Pittsburgh, Pa.
Edward B. Wall, *Supt M. P*......Columbus, O
(1) P., C. & St. L. Div.: E. B. Taylor, *Supt*. Pittsburgh, Pa.
C. B. Street, *M. M*.. ....Dennison, O.
J. M. Copeland, *G. F. Car Shops*. Steubenville, O
2) C. & M. V. Div.: W. F. Black *Supt*..Zanesville, O.
Leroy Kells, *M. M*.. . ...Lancaster, O.
Wm. Meikle, *Gen. For*......... Lancaster, O.
Daniel Jewell, *Gen. F. Car Shops*. Lancaster, O.
(3) Li. Mi. Div.: Ralph Peters, *Supt*....Cincinnati, O.
Leroy Kells, *M. M*.............Cincinnati, O.
Jos. Underwood, *G. F. Car Shops*. Cincinnati, O.
(4) J. M. & I. R. R.: E. W. McKenna, *Supt*. Louisville, Ky.
Wm. Swanston, *M. M*. ...Jeffersonville, Ind.
Edw. Austin, *G. F. C. Shops*. Jeffersonville, Ind.
(5) Indianapolis & Vincennes R. R.
J. J. Turner, *Supt*.. ....Indianapolis, Ind.
Pittsburgh, Cleveland & Toledo R. R.
4-8¾ g. 78 m. 18 lo. 525 cars.
C. H. Andrews, *Pres*............Youngstown, O.
W. F. Hofecker, *M. M*... ...Youngstown, O.
Pittsburgh, Ft. Wayne & Chicago Ry. (*See Penna. Co.*)
Pittsburgh Southern Ry. (*See Balt. & O.*
Pitts. & Castle Shannon R. R. 3-4 g. 9 m. 5 lo. 428 c.
Gen. Supt... Pittsburgh, Pa.
Holmes Ward, *M. M*......Castle Shannon, Pa.
Wm. E. Long, *M. C. B* .... Pittsburgh, Pa.
Pitts. & Lake Erie R. R. 4-8¾ g. 70 m. 30 lo. 1,528 c.
W. C. Quincy, *Gen. Man*........Pittsburgh, Pa.
D. H. Hostetter *Pur. Agt*.... . Pittsburgh, Pa.
R. W. Jones, *Mast. Trans*......Pittsburgh, Pa.
S. W. Haines, *M. M*........ ....Pittsburgh, Pa.
Pittsburgh, McKeesport & Youghiogheny.
4-8¾ g. 57 m. 19 lo. 278 cars.
W. C. Quincy, *Gen. Man*...... Pittsburgh, Pa.
R. W. Jones, *M. of Trans*......Pittsburgh, Pa.
S. W. Haines, *M. M* .... Pittsburgh, Pa.
Pitts. & Western R. R. 3 & 4-8½ g. 274 m. 50 lo. 1,407 c.
Pitts., Bradford & Buff. Ry. 3 g. 93 m. 8 lo. 163 c.
Tho. M. King, *Gen. Man*.........Allegheny Pa.
J. T. Johnson, *Supt*.... ....Allegheny, Pa.
J. Morton Hall, *Pur. Agt*..... ..Allegheny, Pa.
W. M. Flahavhan, *M. M*.........Allegheny, Pa
Pontiac, Oxford & Pt. Austin R. R. 100 m.
Geo. W. Debevoise, *Pr. & Gen. Man*. N. York, N. Y.
Jas. Houston, *Gen. Supt*....... ..Pontiac, Mich.
Port Huron & No.-Western Ry. 3 g. 218 m. 14 lo. 288 c.
H. McMorran, *G. Man. & P. A*. Port Huron, Mich.
I. R. Wadsworth, *Supt*.. ...Port Huron, Mich.
Chas. Diefenbach, *M. M*.....Port Huron, Mich.
Benj. Hillier, *M. C. B*........Port Huron, Mich.
Port Jervis & Monticello R. R. 4-8½ g. 24 m. 3 lo. 13 c.
M. V. Heller, *Gen. Man*......Port Jervis, N. Y.
Port Royal & Augusta, 5 g. 180 m. 16 lo. 310c.
and Augusta & Knoxville Rys.
J. N. Bass, *Supt*...... ....Augusta, Ga.
T. F. Warwick, *M. M. & M. C. B*. Augusta, Ga
Portland & Ogdensburg. 4-8½ g. 110 m. 11 lo. 311 c.
J. Hamilton, *Gen. Supt. & P. A*..Portland, Me.
M. M....... ....Portland, Me.
W. G. Brewer, *M. C. B*... ... .Portland, Me.
Portland & Rochester R. R. 4-8½ g. 52 m. 8 lo. 226 c.
J. W. Peters, *Supt. & Pur Agt*...Portland, Me.
E. H. C. Tompson, *For. of Mach*..Portland, Me.
David Dow, *For. of Car Repairs*. Portland, Me
Potomac, Fred.'g & Pied. R. R 3 g. 38 m 2 lo. 38 c.
Will M. Grafton, *Supt*.... ..Fredericksburg, Va.
W. J. Sweigard, *M. M* ....Fredericksburg, Va.
Pough., Hart. & Bos. R. R. 4-8½ g. 45 m. 4 lo. 65 c.
J. A. Perkins, *Supt*........Poughkeepsie, N. Y.
John L. Donaldson, *M. M*. Poughkeepsie, N. Y.
Pratt Coal & Iron Company's R. R. 5 g. 20 m. 4 lo. 184 c.
W. L. Gude, *Gen. Man*....... ..Pratt Mines, Ala.
Prescott & Thirty-Fifth Parallel R. R.
4-8½ g. 77 miles in progress.
Samuel A. Henszey, *Gen. Man*..Prescott, Ariz.
Prince Edward Island Ry. 3-6 g. 220 m. 21 lo. 350 c.
Jas. Coleman, *Supt. & Pur. Agt*.;
Jos. Unsworth, *M. Supt. & Storekeeper*; and
D. M. Fraser, *M. C. B*.. .Charlottetown, P. E. I.
Profile & Franconia Notch R. R. 3 g. 15 m. 3 lo. 18 c.
Emmons Raymond, *Pur. Agt*... Boston, Mass.
C. H. Greenleaf, *Supt*......Profile House, N. H.
Prospect Park & Coney Island R. R.
4-8½ g. 15 m. 8 lo. 123 cars.
And. R. Culver, *Pres*...... ....Brooklyn, N. Y
R. Schermerhorn, *Supt* ....Brooklyn, N. Y.
Martin Painter, *M. M*...........Brooklyn, N. Y.
Prov., Warren & Bristol R. R. 4-8½ g. 19 m. 6 lo. 79 c.
Waterman Stone, *Supt*.. .. ..Providence, R. I.
Rufus Smith, *M. M. & C. B*....... .Bristol, R. I.
Prov. & Springfield R. R. 4-8½ g. 23 m. 4 lo. 92 c.
Wm. Tinkham, *Gen. Man*.....Providence, R. I
G. T. Richardson, *M. M*........Providence, R. I.
Prov. & Worcester. 4-8½ g. 50 m. 37 lo. 1,253 c.
W. E. Chamberlain, *Supt* .....Providence, R. I.
A. Griggs, *Supt. L. & C. D*....Providence, R. I.
Pullman's Palace Car Co. 1,100 passenger cars.
Geo. M. Pullman, *Pres*...... .....Chicago, Ill.
H. Porter, *V. Pres*...... ....New York, N. Y.
Geo. F. Brown, *Gen. Supt*...... ...Chicago, Ill
Wm. A. Angell, *Pur. Agt*... ......Chicago, Ill.
S. W. Bretzfield, *Asst. Pur. Agt*. New York, N. Y.
A. Rapp, *Man*. (Chicago Works)...Chicago, Ill.
H. L. Spaulding, *Man*. (Det Shops). Detroit, Mich.
E. A. Benson, *Supt. Shops*... ... St. Louis, Mo.

Q

Quebec Central Ry. 4-8½ g. 156 m. 10 lo. 267 cars.
J. R. Woodward, *Gen. Man*..Sherbrooke, P. Q.
A. Steele, *Supt*.. .... Sherbrooke, Que.
R. D. Morkill, Jr., *Pur. Agt*..Sherbrooke, P. Q.
Jas. Seiveright, *M. M* .... Sherbrooke, P. Q.
Quebec, Montreal, Ottawa & Occidental Ry.
4-8½ g. 354 m. 36 lo. 993 cars.
L. A. Senecal, *Gen. Supt*........Quebec, Que.
Quebec & Lake St. John Ry. 4-8½ g. 36 m. 3 lo. 55 c.
J. G. Scott, *Manager*...............Quebec, Can.
Frank Fournier, *Supt*... ...St. Raymond, P. Q.
John T. Eames, *M. M*.. ....St. Raymond, P. Q.
Queen Anne's & Kent and Townsend Branch R. R.
(*See Penna.*; (4) *Div.*)

R

Raleigh & Augusta Air-Line: Carolina Central Raleigh & Gaston R. Rs. 4-8½ g. 446 m. 52 lo. 1,052 c
John C. Winder, *Gen. Man. & P. A*. Raleigh, N. C.
Raleigh Rds. 4-8½ g. 200 m. 27 lo. 638 cars.
B. R. Harding, *Supt. of Mach*. Raleigh, N. C.
Carolina Cen. R. R. 4-8½ g. 242 m. 26 lo. 431 c.
L. C. Jones, *Supt*... .....Wilmington, N. C.
James Maglenn, *M. of Mach*. Laurinburg, N. C.
S. R. Ethridge, *M. C. B* ...Laurinburg, N. C.
Rensselaer & Saratoga R. R. (*See Del. & Hud. Can. Co.*)
Rhinebeck & Connecticut. (*See Hart. & Ct. Wn.*)
Richmond, Fredericksburg & Potomac R. R.
4-9 g. 81 m. 15 lo. 149 cars.
E. T. D. Myers, *Gen. Supt* .. Richmond, Va.
T. L. Courtney, *Asst. Supt* ..Richmond, Va.
H. Kuhn, *M. M*........... ...Richmond, Va.
W. H. Trainham, *M. C. B*. ...Richmond, Va.
Rich., York River & Ches. R. R. (*See Rich. & Dan.*)
Richmond & Alleghany R. R. 4-9 g. 261 m. 19 lo. 837c.
Decatur Axtell, *Rec. & Gen. Man*. Richmond, Va.
M. Sweeney, *Pur. Agt*.. ....Richmond, Va
Geo. D. Harris, *M. M. & C. B*. ..Richmond, Va
Richmond & Danville R. R. Co.'s Roads.
1,736 miles 218 loco. 3,833 cars.
A. L. Rives, *Gen. Man* ....Richmond, Va
Peyton Randolph, *As. G. Man*..Richmond, Va.
J. P. Minetree, *Pur. Agt*........ Richmond, Va.
R. D. Wade, *Supt. Mo. Po*... ...Richmond, Va.
(1) Rich. & Dan. R. R. 5 g. 847 m. 131 lo. 2,687 cars.
Rich. & Dan. Div.: 5 g. 320 m. 80 lo. 1,797 c
Wm. H. Green, *Supt*....... ....Richmond, Va.
M. M... ....Richmond, Va.
J. B. Vaughan, *For. Car Sh*...Richmond, Va.
North Carolina Div. 5 g. 223 m. 22 lo. 268 cars.
A. B. Andrews, *Supt*.... ......Raleigh, N. C.
W. H. Turrentine, *M. M*. Comp'y's Shops, N. C.
J. C. Holt, *For. Car Sh*. Comp'y's Shop N. C.
Atlanta & Char. Air Line. 5 g. 286 m. 31 lo. 415 c.
Narrow-Gauge Branches. 3 g. 80 m. 5 lo. 41 c.
Edmund Berkley, *Supt*.... ....Atlanta, Ga.
T. W. Gentry, *M. M*. .. .... .Atlanta, Ga.
Z. T. Smith, *For. Car Sh*..... ... Atlanta, Ga.
(2 Charlotte, Col. & Aug. R. R. 5 g. 239 m. 22 lo. 287 c.
G. R. Talcott, *Supt*..........Columbia, S. C.
J. H. Green, *M. M*. (2 roads)...Columbia, S. C.
(3) Columbia & Greenville R. R. 5 g. 297 m. 22 l. 224 c.
G. S. Talcott, *Supt*...........Columbia, S. C.
J. O. Meredith, *For. E. & C. Rep*.. do.
(4) Virginia Midland Ry. 4-8½ g. 353 m. 41 lo. 631 c.
Supt. Alexandria, Va.
J. E. Waddey, *M. of M*......Alexandria, Va.
J. T. Nalls, *M. C. B*. ...... .Alexandria, Va.
Richmond & Petersburg R. R. 4-8½ g. 25 m. 8 lo. 132 c.
J. R. Kenly, *Supt*..... ....Richmond, Va.
John O'Brien, *M. M*............Richmond, Va.
Rio Grande R. R. 3-6 g. 22 m. 3 lo. 40 cars
M. J. Gomila, *Rec. & Gen. Man* Brownsville, Tex.
G. W. Rendall, *M. M*........ Brownsville, Tex.
M. Markwood, *M. C. B*... ....Brownsville, Tex.
Rio Grande & Pecos Ry. 4-8½ g. 27 m. In progress.
W. W. Hungerford, *Man*.........Laredo, Tex.
Rochester & Lake Ontario Ry. 4-8½ g. 6 m. 2 lo. 10 c.
N. B. Ellison, *Man* ....Rochester, N. Y.
Rochester & Pittsb'g. R. R. 4-8½ g. 260 m. 60 lo. 3,296 c.
Geo. E. Merchant, *Gen. Man*...Rochester N. Y.
J. T. Gardiner, *Gen. Supt*......Buffalo, N. Y.
C. W. Mills, *Supt. M. P*. .. ...Rochester, N. Y.
Rock Island & Mercer County R. R., and
Rock I'd & Peoria Ry. 4-8½ g. 113 m. 13 lo. 357 c.
R. R. Cable, *V.-P. & Gen. Supt*.....Chicago, Ill
R. I. & P. Ry.:
H. B. Sudlow, *Supt. & P. A*....Rock Island, Ill.
Joseph Elder, *M. M*...............Peoria, Ill.
R. I. & M. C. Rd.: H. B. Sudlow, *Supt*. R'k Island, Ill.
J. H. Parks, *M. M*........... .Rock Island, Ill.
Rogersville & Jefferson R. R. 5 g. 16 m. 1 lo. 6 cars.
C. M. Leuty, *Supt*........ Rogersville, Tenn.
Rome (Ga.) R. R. 5 g. 20 m. 2 lo. 17 cars.
Eben Hillyer, *Pres. & Supt*........ Rome, Ga.
O. W. Harbin, *M. M*................ Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4-8½ g. 418 m. 61 lo. 1,831 cars.
H. M. Britton, *Gen. Man. & P. A*. Oswego, N. Y.
Geo. H. Haselton, *S. M. P. & M*. Oswego, N. Y.
E'n Div.: J. D. Remington, *A. Supt*. Watertown, N. Y.
W'n Div.: W. H. Chauncey, *A. Supt*. Oswego, N. Y.
Roodhouse & Scottsville Ry. In progress.
Geo. P. Merrill, *Gen. Man*.........Chicago, Ill.
Ruby Hill R. R. (*See Eureka & Pal.*)
Rumford Falls & Buckfield R. R. 4-8½ g. 29 m. 2 l. 62 c.
L. L. Lincoln, *Supt. & Pur. Agt*...Canton, Me.

S

Sabine & East Texas Ry. (*See Cen. Pac.*)
Sacramento & Placerville R. R. (*See Cen. Pac.*)
Saginaw Bay & Northw'n R. R. 4-8½ g. 31 m. 6 lo. 136 c.
J. Jackson, *Gen. Man*.... ...Pinconning, Mich.
F. T. Lillote, *Act. Pur. Agt*...Pinconning, Mich.
Edward Keeler, *M. M*........Pinconning, Mich.
Saginaw, Tuscola & Huron R. R.
3 g. 50 m. 5 lo. 85 cars.
M. B. Wilkinson, *Gen. Supt*..E. Saginaw, Mich.
Saginaw Valley & St. Louis R. R. 4-8½ g. 39 m. 4 l. 64 c
T. M. Fish, *Gen. Supt*...... ....Ionia, Mich.
N. W. Merrill, *Div. Supt*........Saginaw, Mich.
Allan Bourn, *Pur. Agt*.. ....Detroit, Mich.
Geo. C. Watrous, *M. M*.............Ionia, Mich.
Salt Lake & Western R. R. (*See Un. Pac.*; (6) *Div.*)
San Francisco & No. Pac. 4-8½ g. 139 m. 11 lo. 245 c.
Arthur Hughes, *Gen. Man*..San Francisco, Cal.
H. C. Whiting, *Supt*........ ...San Safael, Cal.
Ed. Reynolds, *Gen. M. M*.........Donahue, Cal.
Ed. Reynolds, *M. C. B*........... Donahue, Cal.
Sanborn, Cooperstown & Turtle M. R. R. In progress.
C. A. Roberts, *Gen. Man*. ......Sanborn, Dak.
Sandy River R. R. 2 g. 18 m. 3 lo. 36 cars.
N. B. Beal, *Pres. & Supt* ....Phillips, Me.
M. Saunders, *M. M. & C. B*...... ..Phillips, Me.
Sandusky, Mansfield & Newark R. R. (*See B. & O.*)
Sanford & Indian River R. R. (*See So. Flor.*)
San Luis Obispo & Santa Maria R. R.
3 g. 20 m. 2 lo. 30 cars.
Charles Goodall, *Man*......San Francisco, Cal.
San Pete Valley R. R. 3 g. 33 m. 2 lo. 57 cars.
S. Bamberger, *Man*......Salt Lake City, U. T.
J. E. Bamberger, *Pur. Agt*.... Salt Lake, U. T.
B. Bates, *M. M*.................. .Morvin, U. T.
Santa Cruz R. R. (*See So. Pac.*; *Nor'n Div.*)
Saratoga, Mt. McGregor & Lake George R. R.
3 g. 11 m. 3 lo. 12 cars.
John McGee, *Supt*. ....Saratoga Springs, N. Y.
Savannah, Florida & W'n Ry. 5 g. 519 m. 62 lo. 1,063 c.
H. S. Haines, *Gen. Man*........Savannah, Ga.
R. G. Fleming, *Supt*.............Savannah, Ga.
A. A. Aveilhé, *Pur. Agt*..........Savannah, Ga.
G. M. D. Riley, *M. of Mach*......Savannah, Ga.
E. Geffcken, *For. Car Dept*.....Savannah, Ga
Sav., Griffin & No. Ala. R. R. *Op. by Central (Ga.)*.
Schuylkill & Lehigh R. R. (*See Phil & Read.*
Scoharie Valley R. R. (*See Middleburg & Sch.*)
Scioto Valley R. R. 4-8¾ g 132 m. 19 lo. 548 cars)
Geo. Skinner, *Supt. & P. Agt*.....Columbus, O.
R. Bromley, *M. M*. ....Portsmouth, O
Seaboard & Roanoke R. R. 4-8½ g. 80 m. 21 lo. 384 c.
Mast. of Trans....Portsmouth, Va.
J. A. Walton, *Pur. Agt*........Portsmouth, Va.
M. M. Pendleton, *S. M. P. & M*. Portsmouth, Va.
Sedalia, Warsaw & Southern Ry. (*See Mo. Pac.*)
Sharpsville R. R. 4-8½ g. 23 m. 3 lo. 13 cars.
Thos. M. King, *V. P. & Gen. Man*. Pittsburgh, Pa.
W. C. Agnew, *Asst. Gen. Man*..Youngstown, O.
Shelby Iron Co. R. R. {5-9 g. 7 m. 2 lo. {50 c.
{3-6 g. 12 m. 3 lo.
J. A. McArthur, *G. Man*..Shelby Ir. Wks, Ala.
R. H. Stoughton, *Supt*..Shelby Iron Wks., Ala.
J. H. Burghardt, *M. M*..Shelby Iron Wks, Ala.
Shell Beach R. R. 5 g. 22 m.
M. R. Spelman, *Supt* ....New Orleans, La.
Shenandoah Valley R. R. 4-9 g. 249 m. 32 lo. 849 c.
Norfolk & Western R. R. 5 g. 486 m. 82 lo. 1,779 c.
J. H. Sands, *Gen. Supt* .... .Roanoke, Va.
W. C. De Armond, *Pur. Agt*. ..Philadelphia, Pa.
Chas. Blackwell, *Supt. of M. P*...Roanoke, Va.
W. A. Morgan, *M. C. B*.........Lynchburg, Va.
Sh. Val. Rd.: D. W. Flickwir, *Supt*., Roanoke, Va.
N. & W.; W. Div.: Frank Huger, *Supt*.; and
N. & W.; E. Div.: N. M. Osborne, *Supt*.; and
J. T. Robinett, *M. M*. . .. Petersburg, Va.
Shenango & Allegheny R. R. 4-8½ g. 74 m. 8 lo. 248 c.
J. T. Blair, *G. Man. & Pur. Agt*. Greenville, Pa.
Edw. Richardson, *M. M. & C. B*. Greenville, Pa.
Shepaug R. R. 4-8½ g. 38 m. 3 lo. 28 cars.
Edwin McNeill, *Supt*............Litchfield, Ct.
A. J. Broughet, *M. M*.......... Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt*....Ripley, Miss
W. H. Phelps, *M. M*............. ..Ripley, Miss.
Silver City, Deming & Pacific R. R. 3 g. 47 m. 3 l. 141 c.
John W. Smith, *Gen. Supt*....Silver City, N. M.
Silver Lake Ry. 4-8½ g. 6 m. 1 lo. 4 cars
S. L. Chapin, *Supt*............... ..Perry, N. Y.
Sinaloa & Durango R. R. 4-8½ g. 39 m. 2 lo. 40 cars.
Geo. S. Skilton, *Gen. S*. Culiacan, Sinaloa, Mex.
John E. Bell, *M. M*...............Culiacan, Mex.
Skaneateles R. R. 4-8½ g. 5 m. 2 lo. 5 cars.
J. McNamara, *Supt*.........Skaneateles, N. Y.
Sioux City & Pacific R. R. 4-8½ g. 427 m. 31 lo. 893 c.
W. P. Linsley, *Gen. Man*.... Missouri Valley, Ia.
C. M. Lawler, *Gen. Supt*....Missouri Valley, Ia.
R. W. Hamer, *Pur. Agt*.. ....Chicago, Ill.
W. G. Brownson, *Asst. Supt*.... .Norfolk, Neb.
S. A. Teal, *M. M*....... ....Missouri Valley, Ia.
W. H. Ramseyer, *M. C. B*. ..Missouri Valley, Ia.
Smyrna & Delaware Bay R. R. (*See Kent County.*)
Sodus Bay Ry. (*See Northern Central.*)
Somerset R. R. 4-8½ g. 25 m. 3 lo. 24 cars.
W. M. Ayer, *Supt & Pur. Agt*......Oakland, Me.
S. P. Mosher, *For. Car Rep*.... .Oakland, Me.
C. Crowell, *For. Lo. Rep's*.....No. Anson, Me.
Somerset & Cambria R. R. (*See B. & O.*)
Sonora Ry. (*See A., T. & S. Fe.*)
Sonoma Valley:
Arthur Hughes, *Gen. Man*. San Francisco, Cal.
H. C. Whiting, *Supt* ....San Rafael, Cal.
J. T. Peters, *Asst. Supt*.......Glen Ellen, Cal.
Ed. Reynolds, *M. M*... .... Donahue, Cal.
South & North Alabama R. R. (*See Louis. & Nash.*)
South Carolina Ry. 5 g. 246 m. 46 lo. 834 cars.
John B. Peck, *Gen. Man*. ......Charleston, S. C.
S. B. Pickens, *Pur. Agt*........Charleston, S. C.
P. J. Cochrane, *Mast. of Mach*. Charleston, S. C.
Geo. H. Gramling, *M. C. B*....Charleston, S. C
South-Eastern Ry. 4-8½ g. 280 m. 30 lo. 1,000 cars.
T. A. McKinnon, *Gen. Man*.....Montreal, Can.
A. G. Eastman, *M. M*..........Farnham, P. Q.
South Florida R. R. 3 gauge 115 m. 13 lo. 250 cars.
B. R. Swoope, *Supt. & P. A*.......Sanford, Fla.
R. De by, *M. M*........... ......Sanford, Fla.
A. D. Stentiford, *M. C. B*..........Sanford, Fla.
South Mountain R. R. 4-8½ g. 18 m. 4 lo. 22 c.
W. H. Woodward, *Supt*. Pine G've Furnace, Pa.
South Pacific Coast R. R. 3 g. 81 m. 16 lo. 500 cars
L. Fillmore, *Gen Supt*. ....San Francisco, Cal.
W. H. Masterman, *M. M. & C. B*. Newark, Cal.
South-Western R. R. (Ga.) (*See Central of Ga.*)
South-Western Ry. (Ky.) 4-8½ g. 5 m. 1 lo. 28 cars.
M. Tabler, *Supt. & Man*......Harrodsburg, Ky.
J. C. Hool, *Pur. Agt*.... ....Harrodsburg, Ky.
Southern Central R. R. 4-8½ g. 156 m. 21 lo. 467 c.
H. D. Titus, *Gen. Supt. & P. A*.....Auburn, N. Y
John White, *M. M*... ....Auburn, N. Y.
H. Mooney, *M. C. B*..............Auburn, N. Y.
Southern Kansas Ry. (*See At., Top. & Santa Fe.*)
Southern Maryland R. R. 4-8½ g. 20 m. 1 lo. 20 c.
J. B. Ridgway, *Supt*.........Brandywine, Md.
C. R. Joyce, *M. M*......... ...Brandywine, Md
Southern Pacific R. R. 4-8½ g. 203 m. 335 lo. 780 c.
Northern Div. (*For other Divs. see Cen. Pac.*)

A. C. Bassett, *Supt*.......San Francisco, Cal
J. R. Watson, *Pur. Agt*.....Sacramento, Cal.
J. T. Wilson, *M. M*.......San Francisco, Cal.
F. N. Bellisle, *M. C. B.* ...San Francisco, Cal.
Southern Pacific R. R. of Arizona. (*See Cen. Pac.*)
Southern Pacific R. R. of New Mexico. (*See Cen. Pac.*)
Spartanburg, Union & Columbia R. R.
(*See Rich. & Dan.*; (3) *Div.*
Spring Brook R. R. 4-3 g. 8 m. 1 lo. 18 cars.
Charles Pugh, *Pres*..........Pittston, Pa.
Spring Hill & Parrsboro Ry. (*See Cumberland.*)
Springfield, Effingham & So.-E'n Ry. (*See Ind. & Ill.*)
Springville & Sardinia Ry. 4-8½ g. 12 m. 1 lo. 8 c.
Bertrand Chaffee, *Pres*.......Springville, N. Y.
St. Croix & Penobscot R. R. 4-8½ g. 22 m. 4 lo. 195 c.
S. W. Haycock, *Supt. & Pur. Agt*. .Calais, Me.
G. H. Corsen, *M. M*.............Milltown, Me
H. C. Tincker, *M. C. B*...........Milltown, Me
St. Helen, Houghton Lake & West.R.R.4-8½ g. 13 m.
Z. C. Jessop, *Gen. Man*.........Detroit, Mich
St. John & Maine Ry. (*See New Brunswick.*)
St. John's Ry. 4-8½ g. 14½ m. 2 lo. 24 cars.
R. McLaughlin, *Pr. & Supt*. .Jacksonville, Fla.
J. M. Owens, *M. of Mach*....St. Augustine, Fla.
St. John's & Lake Eustis Ry. (*See Florida Southern.*)
St. Johnsb'ry & Lake Champ 4-8½ g. 120 m 15 lo. 372 c.
A. B. Jewett, *Supt. & P. A*..St. Johnsbury, Vt
Geo. E. Howe, *M. M. & C. B*.St. Johnsbury, Vt
St. Joseph Valley R. R. 3 g. 15 m. 1 lo. 11 cars.
E. T. Chase, *Gen. Man*...Berrien Springs, Mich
St. Joseph & Des Loge Ry. 3 g. 13 m. 4 lo. 70 cars.
T. T. Onderdonk, *Supt*......Bonne Terre, Mo
St. Joseph & Western R. R.
4-8½ g 252m. 21 lo. 175 cars.
L. D. Tuthill, *Gen. Supt. & P. A*.St. Joseph, Mo.
E. Sleepy, *M. M. & . C. B*....St. Joseph, Mo.
St. Joseph & Des Moines R. R. (*See K. C., St. J. & C. B.*)
St. Lawrence & Ottawa Ry. (*See Can. Pac.*)
St. Louis, Alton & Terre Haute R. R.
Main Line. (*See C., C., C. & I.; Ind. & St. L. Div.*
St. Louis & Cairo Div.: 4-8½ g 137 m. 19 lo. 800 c
G. W. Parker, *Gen. Man*.......St. Louis, Mo.
J. L. Hinckley, *Supt*...........Belleville, Ill.
R. M. Pringle, *M. M*..........E. St. Louis, Ill.
St. Louis Bridge Co. and Tunnel R. R.
4-8½ g. 31 m. 22 lo. 11 cars.
Wm. Taussig, *Gen. Man*..........St. Louis, Mo
A. W. Dickinson, *Supt*.............St. Louis, Mo.
J. E. Williams, Jr., *Pur. Agt*....St. Louis, Mo
H. M. Smith, *M. M*................St. Louis, Mo.
St. Louis, C. Cœur & St. Ch. Ry. 3 g. 16 m.
F. M. Colburn, *Gen. Man*.........St. Louis, Mo.
St. Louis Coal R. R. 4-8½ g. 93 m. 10 lo. 217 cars.
R. J. Cavett, *Supt*..............Carbondale, Ill.
Jas. C. Bryden, *Pur. Agt*.........St. Louis, Mo.
St. Louis, Des Moines & Northern Ry. 4-8½ g. 43 m.
C. F. Merk, *Supt*..............Des Moines, Ia.
St. L., Ft. Scott & Wichita R.R. 4-8½ g. 214 m. 6 l. 337 c.
J. W. Miller, *V. P. & Gen. Man*..Fort Scott, Kan.
Tho. N. Lewis, *Asst. Supt*......Fort Scott, Kan.
Henry Berger, *M. M*.............Ft. Scott, Kan.
St. L., Hannibal & Keokuk. 4-8½ g. 85 m. 5 lo. 70 c.
E. C. Case, *Rec. & Man*........Hannibal, Mo.
E. W. Hoisington, *M. M*.........Hannibal, Mo.
St. Louis, Iron Mt. & So'n Ry. (*See Mo. Pac.*; (4) *Div.*)
St. L., Keokuk & No.-W'n. Ry. (*See C., B. & Q.*)
St. L., Salem & Little Rock. 4-9 g. 72 m. 5 lo. 111 c.
H. A. Crawford, *V. Pr. & P. A*...St. Louis, Mo.
E. B. Sankey, *Supt*..................Salem, Mo.
Thomas Everson, *M. M*..........Steelville, Mo
J. W. Houston, *M. C. B*...........Steelville, Mo.
St. Louis & Cairo R. R. 3 g. 152 m. 22 lo. 896 cars.
Chas. Hamilton, *Gen. Supt*......St. Louis, Mo.
T. W. Newell, *M. M*............E. St. Louis, Mo.
St. L. & San Fran. Ry. 4-8½ g. 943 m. 103 lo. 3,737 c.
C. W. Rogers, *V. P. & Gen. Man*..St. Louis, Mo.
D. H. Nichols, *Supt. Tran*..No. Springfield, Mo.
A. P. Mann, Jr., *Pur. Agt*.........St. Louis, Mo.
M. Kearney, *M. M. & C. B*..No. Springfield, Mo.
East Div.: A. Veech, *Supt*...........St. Louis, Mo.
Central Div.: W. A. Thoms, *Supt*..Springfield, Mo.
Kan. Div.: J. R. Wentworth, *Supt*. Neodesha, Kan.
St. Martin's & Upham Ry. 4-8½ g. 30 m. 2 lo. 8 cars.
A. E. Killam, *Manager*........St. Martin's, N. B.
St. Paul Eastern Grand Trunk Ry. 4-8½ g. 15 m.
D. C. Lamb, *Gen. Supt*..........Oconto, Wis.
St. Paul, Minneapolis & Manitoba Ry.
4-8½ g. 1,402 m. 201 lo. 5,068 cars.
A. Manvel, *Gen. Man*............St. Paul, Minn.
H. C. Ives, *Asst. Gen. Man*.....St. Paul, Minn.
E. B. Wakeman, *Asst. Gen. Supt*. St. Paul, Minn.
J. C. Morrison, *Pur. Agt*........St. Paul, Minn.
Thos. Downing, *M. M. & C. B*..St. Paul, Minn.
Breck. Div.: W. S. Kemp, *Supt*...St. Paul, Minn.
F. F. Div.: J. B. Rice, *Supt*........St. Paul, Minn.
No'n Div.: A. Guthrie, *Supt*.....Crookston, Minn.
St. Paul & Duluth R. R. 4-8½ g. 225 m. 37 lo. 1,080 c.
W. H. Fisher, *Gen. Supt*...........St. Paul, Minn.
J. G. Callahan, *Pur. Agt*........St. Paul, Minn.
Chas. F. Ward, *M. M. & M. C. B*..St. Paul, Minn.
State Line & Sullivan R. R. 8½ g. 25 m. 3 lo. 263 c.
I. O. Blight, *Supt*..................Towanda, Pa.
Staten Island R. R. ¼ g. 13 m. 4 lo. 18 c
J. W. Wilbur, *Supt*............New York, N. Y
Stony Clove & Catskill Mountain R. R.
3 g. 14 m. 2 lo. 22 cars.
Geo. Coykendall, *Gen. Supt*....Rondout, N. Y
Stony Creek R. R. 4-8½ g. 103 m.
Geo. B. Boggs, *Supt*...........Norristown, Pa.
Sterling Mountain Ry. 6 g. 8 m. 2 lo. 145 cars.
J. C. Missimer, *Supt*..........Sloatsburg, N. Y.
Suffolk Lumber R. R. 3 g. 15 m. 3 lo. 41 cars.
W. M. Whaley, *Supt*..................Suffolk, Va.
Summit Branch R. R. 4-9 g. 20 m. 7 lo. 10 cars.
Thomas Gucker, *Supt*........Williamsport, Pa.
Susquehanna & Delaware River R. R. In progress.
D. Y. Kilgore, *Pres*............Philadelphia, Pa.
Sussex R. R. (*See Del., Lack. & West.*)
Syracuse, Binghamton & N. Y. R. R. (*See D. L. & W.*)
Syr., Ontario & N. Y. R. R.
Albert Allen, *Supt*...............New York, N. Y
Syracuse, Geneva & Corning; Corning, Cowanasque & Antrim R. Rs. 4-8½ g. 142 m. 28 lo. 1,044 c.
A. H. Gorton, *Supt*.............Corning, N. Y.
W. E. Gorton, *Asst. Supt*.........Corning, N. Y.
W. H. Chaphe, *Pur. Agt*.........Corning, N. Y.
O. C. Patchell, *M. M*.............Corning, N. Y.
C. J. Butler, *M. C. B*.............Corning, N. Y.

T

Tennessee Coal R. R. 5 g. 28 m. 8 lo. 204 cars.
A. M. Shook, *Gen. Man*......Tracy City, Tenn.
W. A. Knight, *M. M*..........Tracy City, Tenn.
Tennessee & Sequatchee Valley R. R.
3 g. 42 m. 1 lo. 24 cars.
Chas. Clinton, *Gen. Supt*....Spring City, Tenn.
P. V. Mooney, *Pur. Agt*......Spring City, Tenn.
Terre Haute & Indianapolis R. R.
4-9 g. 421 m. 105 lo. 4,318 cars.
Joseph Hill, *Gen. Supt*..........St. Louis, Mo.
C. R. Peddle, *P. Agt*........Terre Haute, Ind.
Geo. H. Prescott, *S. M. P. & M*. Terre Haute, Ind.
F. C. Cleaver, *M. M*.........Terre Haute, Ind
E. D. Carter, *M. C. B*.......Terre Haute, Ind.
Chas. Butler, *M. M*...............Effingham, Ill.
Clinton Idler, *Foreman* ... Indianapolis, Ind.
Terre Haute & So.-Eastern Ry. 4-9 g. 44 m. 2 lo. 145 c.
Geo. Atherton, *Supt*.........Terre Haute, Ind.
Texas-Mexican Ry. (*See Mex. Nat.*.
Texas Trunk R. R. 4-8½ g. 36 m. 2 lo. 8 cars.
Hugh Irwin, *Gen. Supt*..............Dallas, Tex.
Texas Western Ry. 3 g. 52 m. 2 lo. 44 cars.
Henry Hatch, *Gen. Man*...........Houston, Tex.
T. F. Glispin, *M. M*.................Houston, Tex.
Texas & N. O. R. R. (*See Cen. Pac.; G. H. & S. A. Div.*)
Texas & Pacific. (*See Mo. Pac. Ry.*; (6) *Div.*)
Texas & St. Louis Ry. 3 g. 769 m. 84 lo. 2,000 cars.
W. R. Woodard, *Rec. and Gen. Man*. St. Louis, Mo.
J. J. Frey, *Gen. Supt*..........Pine Bluff, Ark.
C. S. Brooke, *Pur. Agt*..........St. Louis, Mo.
M. B. Jones, *M. C. B*............Pine Bluff, Ark.
Mo. & Ark. Div.:
W. H. Adams, *Supt*.............Pine Bluff, Ark.
Rich. Williams, *M. M*.........Pine Bluff, Ark.
Tex. Div.. H. Flanders, *Supt*.........Tyler, Tex.
P. J. Milan, *Gen. M. M*...........Pine Bluff, Ark.
Tionesta Valley R. R. 3 g. 15 m
George Dickinson, *Gen. Supt*.... Sheffield, Pa
Tioga R. R. 4-8½ and 6 g. 67 m. 18 lo. 960 cars.
L. H. Shattuck, *Supt*..............Blossburg, Pa.
J. C. Guthrie, *Pur. Agt*..........New York, N. Y.
Pere Bonny, *M. M*..................Blossburg, Pa.
D. H. Stratton, *M. C. B*.........Blossburg, Pa.
Toledo, Ann Ar. & No. Mich. Ry.
4-8½ g. 63 m. 9 lo. 186 c.
J. M. Ashley, *Gen. Man*.......Ann Arbor, Mich.
H. W. Ashley, *Supt. & Pur. Agt*. do
C. C. Dodge, *M. M*..............Ann Arbor, Mich.
Toledo, Cin. & St. Louis R. R. 3 g. 798 m. 101 lo. 3,500 c.
E. P. Murray, *Gen. Supt*.............Toledo, O.
F. W. Stewart, *P. Agt*.................Toledo, O.
Thos. Robertson, *M. M*.............Delphos, O.
Toledo Div.: W. H. Vandergrift, *Supt*.; do
J. S. Wiers, *For. Car Rep*.........Delphos, O.
St. Louis Div.: Frank F. Allen....Charleston, Ill.
P. H. Murphy, *M. M*..........Charleston, Ill.
Toledo & Indianapolis R. R. 4-8½ g. 43 m. 4 lo. 118 c.
David Robison, Jr., *Rec*..............Toledo, O.
Toledo & South Haven R. R. (*See Paw Paw.*)
Tonawanda Val. & Cuba R. R. (*See Brad., B. & K.*)
Toronto, Grey & Bruce Ry. (*See Canadian Pacific.*)
Toronto & Nipissing Ry. (*See Mid. Ry. of Can.*)
Troy & Boston R. R. 4-8½ g. 48 m. 20 lo. 484 cars.
D. Robinson, *Pres*......................Troy, N. Y.
Joseph Crandell, *Supt*..................Troy, N. Y.
C. H. Hubbell, *Pur. Agt*...............Troy, N. Y.
Z. B. Davis, *M. M*......................Troy, N. Y.
A. Brewer, *M. C. B*.....................Troy, N. Y.
Troy & Greenfield R. R. & H. Tunnel. 4-8½ g. 44 m.
A. W. Locke, *Man*.........North Adams, Mass.
Tuckerton R. R. 4-9 g. 31 m. 2 lo. 29 cars
J. J. Pharo, *Supt. & Pur. Agt*. Tuckerton, N. J.

U

Ulster & Delaware R. R. 4-8½ g. 74 m. 10 lo. 218 cars.
Jas. H. Jones, *Supt*..............Rondout, N. Y.
John H. Decker, *M. C. B*........Rondout, N. Y.
Union Ry. 5 g. 9 m. 3 lo.
C. E. James, *Pres*.......... Chattanooga, Tenn.
D. J. O'Connell, *Gen. Man*. Chattanooga, Tenn.
Union Pacific Ry. (7 Gen. Divs.)
3 & 4-8½ g. 4,633 m 510 lo. 10,550 cars.
S. R. Callaway, *Gen. Man*..........Omaha, Neb.
S. T. Smith, *Gen. Supt*..............Omaha, Neb.
Thos. L. Kimball, *Asst. Gen Man*. Omaha, Neb.
Pur. Agt.............Omaha, Neb.
I. H. Congdon, *S. M. P. & C. D*...Omaha, Neb.
John Wilson, *Asst. do*................Omaha, Neb.
(1) Neb. Div.: O. H. Dorrance, *Gen. Supt*. Omaha, Neb.
E. Div.: C. B. Havens, *Supt*...........Omaha, Neb.
M. M.............Omaha, Neb.
A. M. Collett, *M. C. B*............Omaha, Neb.
L. Pole Div.: W. A. Deuel, *Supt*..Cheyenne, W. T
J. H. McConnell, *M. M*.........N. Platte, Neb.
(2) Wy. Div.: E. Dickenson, *Gen. Supt*..Laramie, W. T.
T. A. Davis, *M. M*................Laramie, W. T.
Wes. Div.: C. E. Wurtelle, *Supt*. Evanston, W. T.
Geo. F. Chapman, *M. M*.......Evanston, W. T.
(3) Idaho Div.: R. Blickenderfer, *Gen. Supt*. Ogden, U.
F. Rearden, *M. M*..................Shoshone, Id.
Ogden Short Line Div.:
R. Blickensderfer, *Supt*..........Pocatello, Id.
Utah & Northern Div.:
J. S. Hickey, *M. M*...............Eagle Rock, Id.
J. W. Paul, *Gen. For. C. D*...Eagle Rock, Id.
(4) Col. Cent. Div.: A. A. Egbert, *Gen. Supt*. Denver, Col.
F. Meirtsheimer, *M. M*...........Denver, Col.
C. C. Div.: P. Touhy, *Supt*..........Denver, Col.
So. Park Div.: J. T. Choate, *A. Supt*..Como, Col.
(5) Kan. Div.: H. O. Brinkerhoff, *G. Supt*. Kan. City, Mo.
K. Pac. Div.: J. O. Brinkerhoff, *Supt*. Kan. C'y, Mo.
J. O. Chapman, *M. M*.........Armstrong, Kan.
T. B. Roberts, *M. C. B*.......Armstrong, Kan.
Kansas Central Div.:
J. O. Brinkerhoff, *Supt*..Leavenworth, Kan.
Smoky Hill Div.:
O. H. Dorance, *Supt*..............Wallace, Kan.
J. B. Dailey, *M. M*.....................Ellis, Kan.
(6) Salt Lake & Western Div.:
W. W. Ritter, *Supt*......Salt Lake City, Utah.
(7) Nevada Central Ry. 3 g. 93 m. 4 lo. 78 cars.
Jos. K. Choate, *Gen. Supt. & P. A*. Battle Mt., Nev.
United States Rolling Stock Co. 19 lo. 4,692 cars.
A. Hegewisch, *Pres*..............New York, N. Y.
W. H. Chaddock, *Gen. Agt*.........Chicago, Ill.
Upson County R. R. (*See Central of Ga.*)
Utah Central Ry. 4-8½ g. 280 m. 21 lo. 358 cars.
John Sharp, *Gen. Supt*. Salt Lake City, Utah.
S. H. Hill, *Pur. Agt*.... Salt Lake City, Utah.
Geo. G. Bywater, *M. M*..Salt Lake City, Utah
Peter Reid, *M. C. B*.......Salt Lake City, Utah.
Utah & Nevada Ry. 3 g. 37 m. 3 lo. 33 cars
W. W. Ritter, *Gen. Man*...Salt Lake City, Utah.
Robert Anderson, *M. M*...Salt Lake City, Utah.
Utah & Northern Ry. (*See Union Pac.*; (3) *Div.*)
Utah & Pleasant Valley Ry. (*See Den. & Rio. Gr.*)
Utica, & Black Riv. R. R. 4-8½ g. 180 m. 25 lo. 412 c.
E. A. Van Horne, *Gen. Supt. & P. A*..Utica, N. Y.
H. W. Hammond, *Asst. Supt*.......Utica, N. Y.
John Bailey, *M. M*....................Utica, N. Y.
David James, *M. C. B*...............Utica, N. Y.

V

Vaca Vall. & Clear Lake R. R. 4-8½ g. 30 m. 2 lo. 19 c.
G. B. Stevenson, *Gen. Supt*.......Vacaville, Cal.
Valley Ry. (Ohio) 4-8¾ g. 85 m. 21 lo. 889 cars.
Isaac Reynolds, *Gen. Man*........Cleveland, O.
Supt.............Cleveland, O.
H. Melcher, *Pur. Agt*.............Cleveland, O.
C. T. Johns, *M. M*.................Cleveland, O.
Valley R. R. Va. 4-8½ g. 62 m
S. Spencer, *Pres*...................Baltimore, Md.
Vermont Valley R. R. (*See Conn. River.*)
Vicksburg & Brunswick R. R. (*See Cen. of Ga.*)
Vicksburg & Meridian R. R. (*See Cin., N. O. & Tex. Pac.*)
Vicks. Shreveport & Pac. R. R. (*See C., N. O. & T. P.*)
Victoria Ry. (*See Midland Ry. of Can.*)
Virginia Midland Ry. (*See Rich. & Dan.*; (4) *Div.*)
Virginia & Truckee R. R. 4-8½ g. 52 m. 14 lo. 322 c.
Carson & Colorado R. R. 3 g. 294 m. 8 lo. 228 c
H. M. Yerington, *Gen. Supt*......Carson, Nev.
R. J. Laws, *A. Supt*. (C. & Col.) Hawthorne, Nev.
Hume Yerington, *Pur. Agt*........Carson, Nev.
I. N. Fording, *M. M*..................Carson, Nev.
M. M. Hyde, *M. C. B*.................Carson, Nev.

W

Wabash, Chester & W'n R. R. (*See St. Louis Coal.*)
Wabash, St. Louis & Pacific Ry. (4 Gen. Divs.)
4-8½ g. 3,241 m. 598 lo. 17,230 cars.
Jas. F. Joy, *Pres*...................St. Louis, Mo.
A. L. Hopkins, *V. P*................St. Louis, Mo.
A. A. Talmage, *Gen. Man*.......St. Louis, Mo.
H. H. Wellman, *Pur. Agt*.........St. Louis, Mo.
Jacob Johann, *Supt. M. P. & M*. Springfield, Ill.
M. M. Martin, *Supt. Car Dept*.....Decatur, Ill.
(1) Eas'n Div.: G. W. Stevens, *Supt*..........Peru, Ind.
J. B. Barnes, *M. M*.............Fort Wayne, Ind.
John McKenna, *M. M*......................Peru, Ind.
Cairo Div.: C. F. Lape, *M. M*....Mt. Carmel, Ill.
Rant'l Div.: B. F. Mathias, *Asst. Supt*. Rantoul, Ill.
C. W. Hollister, *Gen. For*..............Rantoul, Ill.
(2) Middle Div.: E. N. Armstrong, *Supt*. Decatur, Ill.
Theo. Bergold, *M. M*...........Springfield, Ill.
B. B. Rose, *M. C. B*..................Decatur, Ill.
G. A. Hurd, *Asst. Supt*.............Decatur, Ill.
E. B. Hyde, *Asst. Supt*..............Havana, Ill.
(3) Western Div.: R. G. Butler, *Supt*....Moberly, Mo
W. H. Selby, *M. M*.................Moberly, Mo.
C. S. Buck, *M. C. B*.................Moberly, Mo.
John Long, *A. Supt. C. D*..........Moberly, Mo.
D. Moin. Div.: C. F. Meek, *A. Supt*. Des Moines, Ia
Walden's Bridge R. R. 3 g. 23 m. 3 lo. 37 cars.
John G. Scott, *Gen Man*....Jenks P. O., Tenn.
Wallkill Valley.
J. E. Childs, *Gen. Supt*.........New York, N. Y.
Geo. H. Graves, *Supt*..............Kingston, N. Y
E. Minshull, *M. M*...............Middletown, N. Y.
I. W. Fowler, *Pur. Agt*.........Middletown, N. Y.
Walla Walla & Columbia Riv. R. R. (*See Ore. Ry.*)
Walton R. R. 5 g. 10 m. 1 lo. 7 cars.
D. H. Walker, *Pres*.....................Monroe, Ga.
Warren & Farnsworth Valley R. R.
3 g. 16 m. 3 lo. 39 cars.
A. D. Wood, *Gen. Man*..................Warren, Pa.
Warwick Valley R. R. (*See Leh. & Hud. River.*)
Wasatch & Jordan Valley R. R. (*See Den. & Rio. Gr.*)
Washington, Ohio & West. R. R. 4-8½ g. 52 m. 5 lo. 87 c.
S. M. Brophy, *Supt*..............Alexandria, Va.
W. Mountjoy, *Act. For*...........Alexandria, Va.
John Harrison, *M. C. B*...........Alexandria, Va.
Waynesburg & Washington Rd. 3 g. 29 m. 3 lo. 26 c.
C. E. Bower, *Supt*................Waynesburg, Pa.
A. M. Kline, *M. C. B*.............Waynesburg, Pa.
Welland Ry. 4-8½ g. 25 m. 4 lo. 147 cars.
William Pay, *Supt*...........St. Catharines, Ont.
Jas. Taylor, *M. M*............St. Catharines, Ont.
Wm. H. Pay, *M. C. B*........St. Catharines, Ont.
West Feliciana R. R. 4-8½ g. 27 m. 2 lo. 22 cars
J. B. McGehee, *Pr. & Gen. Supt*. Bayou Sara, La.
J. A. Tilton, *M. M. & C. B*.....Bayou Sara, La.
W. Va., Central & Pittsb'g Ry. 4-8½ g. 50 m. 4 lo. 119 c.
T. B. Davis, *Gen. Man*.........Piedmont, W. Va.
W. E. Porter, *Gen. Supt*.......Piedmont, W. Va
Geo. W. Harrison, *Pur. Agt*...Piedmont, W. Va.
E. W. Lippencott, *M. M*.......Piedmont, W. Va.
West & East R. R. (*See Ill. Cen.; N. O. Div.*)
West Jersey R. R. (*See Penn. R. R.*; (3) *Div.*)
Western R. R. (of Ala.) 5 g. 85 m. 15 lo. 270 cars.
Atlanta & W. Point Rd. 5 g. 87 m. 14 lo. 240 c.
Cecil Gabbett, *Gen. Man. & Supt*...Mont., Ala.
C. D. Wall, *M. M. & C. B*....Montgomery, Ala
Western Counties' Ry. 4-8½ g. 67 m. 8 lo. 137 cars.
J. Brignell, *Supt*..................Yarmouth, N. S.
Western Maryland R. R. 4-8½ g. 127 m. 28 lo. 610 c.
J. M. Hood, *Pr. & Gen. Man*.....Baltimore, Md.
R. J. Adair, *Pur. Agt*.............Baltimore, Md.
David Holtz, *Mast. of Mach*..Union Bridge, Md.
J. H. Nussear, *M. C. B*.......Union Bridge, Md.
Western No. Carolina R. R. 5 g. 210 m. 17 lo. 160 c.
V. E. McBee, *Supt*..................Salisbury, N. C.
Jos. P. Minetree, *Pur. Agt*.......Richmond, Va.
G. W. Gates, *M. M*..................Salisbury, N. C.
Western & Atlantic R. R. 5 g. 138 m. 58 lo. 952 c.
R. A. Anderson, *Gen. Supt*.........Atlanta, Ga.
A. B. Bostwick, *Asst. Supt*.........Atlanta, Ga.
Lamar Collier, *M. M*...................Atlanta, Ga
Wm. Kinyon, *M. C. B*................Atlanta, Ga.
Wheeling, Pittsburg & Baltimore R. R. (*See B. & O.*)
Wheeling & Lake Erie R. R. 267 m. 37 lo. 1,922 c.
M. D. Woodford, *Rec. & Gen. Man*..Toledo, O.
O. P. Dunbar, *Gen. M. M*............Norwalk, O.
John Hillhouse, *Div. M. M*..........Norwalk, O.
Cleve. & Mar. Div.: P. Pease, *Rec. & Gen. Man*.
A. Galloway, *M. M*.............Cambridge, O.
Whitby, Port Perry & Lindsay Ry. (*See Mid. of Can.*)
White Water R. R. (*See Ft. W., Cin. & Lou.*)
Whitefield & Jefferson R. R. (*See Bos., Con. & Mon.*)
Whitneyville & Machiasport R. R. 8 m. 2 lo. 48 c.
C. Sullivan, *G. M. & Pur. Agt*. Whitneyville, Me.
Wicomico & Pocomoke R. R. 4-8½ g. 30 m. 2 lo. 38 c.
L. Showell, *Pres*.........................Berlin, Md.
Williamsport & North Branch R. R.
4-8½ g. 14 m. 2 lo. 4 cars.
B. G. Welch, *Man. & P. Agt*...Hughesville, Pa.
Williamstown & Del. River R. R.
4-8½ g. 27 m. 1 lo. 12 cars.
Samuel Garwood, *Supt*....Williamstown, N. J
Wilmington, Columbia & Augusta R. R. (*See W. & W.*)
Wilmington & No'n R. R. 4-8¾ g. 85 m. 17 lo. 155 c.
A. G. McCausland, *Supt. & P. A*. Wilmington, Del
George Rommel, *M. M*...........Wilmington, Del.
Alex. Maitland, *M. C. B*.........Wilmington, Del.
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H. Walters, *Gen. Man*...........Baltimore, Md.
J. F. Divine, *Gen. Supt*.......Wilmington, N. C.
John Bisset, *M. M*..............Wilmington, N. C.
W. H. Day, *M. C. B*.................Florence, S. C.
J. H. Davis, *M. C. B*. (W. & W.) Wilmington, N. C.
Winifrede R. R. 4-9 g. 5 m. 1 lo. 65 cars.
Theodore Wright, *Pres*........Philadelphia, Pa.
Windsor & Annapolis Ry. 4-8½ g. 130 m. 10 lo. 160 c.
P. Innes, *Gen. Man*..................Kentville, N. S.
Wm. Yould, *M. M*....................Kentville, N. S.
Wm. Grierson, *M. C. B*.............Kentville, N. S.
Wisconsin Central R. R. 4-8½ g. 480 m. 49 lo. 1,800 c
F. N. Finney, *Gen. Man*.........Milwaukee, Wis.
E. K. Howes, *Pur. Agt*...........Milwaukee, Wis.
W. A. Short, *M. M*..............Stevens Pt., Wis.
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Wisconsin, Iowa & Nebraska.
B. L. Harding, *Gen. Man*..........Des Moines, Ia.
G. C. McMichael, *Supt*.......Marshalltown, Ia.
M. C. Wheeler, *M. M*.........Marshalltown, Ia.
Wisconsin & Michigan R. R. (*See Mil. & North'n.*)
Wisconsin & Minnesota R. R. (*See Wis. Cen.*)
Wood River Branch R. R. 4-8½ g. 6 m. 2 lo. 3 cars.
L. M. Barber, *Supt*..............Hope Valley, R. I.
Woodstock R. R. 4-8½ g. 14 m. 1 lo. 3 cars.
J. G. Porter, *Supt*..................Woodstock, Vt.
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Worcester & Shrewsbury R. R. 3 g. 3 m. 3 lo. 9 c.
J. F. Bigelow, *Supt*..............Worcester, Mass.
G. E. Hapgood, *Pur. Agt*.......Worcester, Mass.
Chas. Cleveland, *M. M*.........Worcester, Mass.
Worcester & Somerset R. R. (*See N. Y., Phil. & Nor.*)

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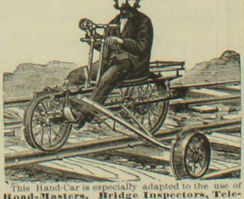

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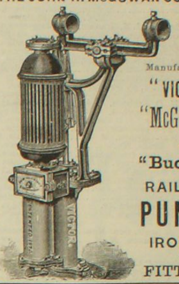

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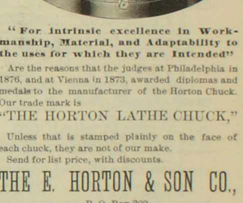

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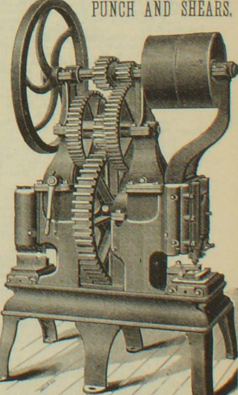

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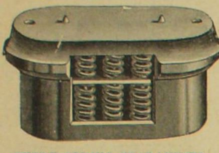

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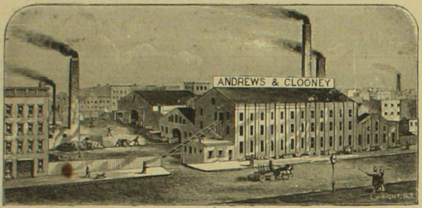

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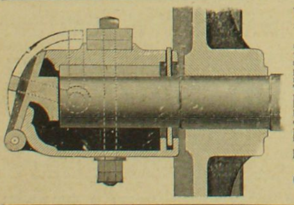

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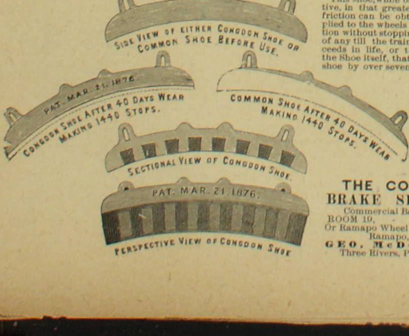
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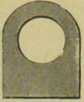

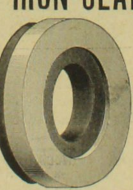

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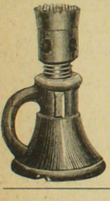

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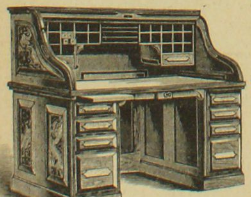

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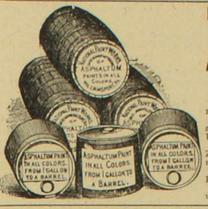

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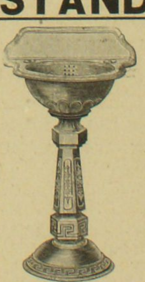

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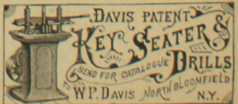

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